MAN A MACHINE

BY

LA METTRIE

1927

THE OPEN COURT PUBLISHING COMPANY

CHICAGO LONDON

MAN A MACHINE.

MAN A MACHINE

BY

JULIEN OFFRAY DE LA METTRIE

INCLUDING FREDERICK THE GREAT'S "EULOGY" ON LA METTRIE AND EXTRACTS FROM LA METTRIE'S "THE NATURAL HISTORY OF THE SOUL"

PHILOSOPHICAL AND HISTORICAL NOTES
BY
GERTRUDE CARMAN BUSSEY
M. A., WELLESLEY COLLEGE

CHICAGO LONDON
THE OPEN COURT PUBLISHING CO.
1927

COPYRIGHT BY
THE OPEN COURT PUBLISHING CO.
1927

PRINTED IN THE UNITED STATES OF AMERICA.

TABLE OF CONTENTS.

	PAGE
Preface	vii
Frederic the Great's Eulogy	xi
Man a Machine	3
Natural History of the Soul	73
Appendix	85
Outline of Metaphysical Doctrine	95
Notes	96
Bibliography	128

Digitized by the Internet Archive
in 2025

https://archive.org/details/manmachine0000juli_b0k3

PREFACE.

This translation is the work of several hands. It is founded on a version made by Miss Gertrude C. Bussey (from the French text in the edition of J. Assezat) and has been revised by Professor M. W. Calkins who is responsible for it in its present form. Mademoiselle M. Carret, of the Wellesley College department of French, and Professor George Santayana, of Harvard University, have given valued assistance; and this opportunity is taken to acknowledge their kindness in solving the problems of interpretation which have been submitted to them. It should be added that the translation sometimes subordinates the claims of English structure and style in the effort to render La Mettrie's meaning exactly. The paragraphing of the French is usually followed, but the italics and the capitals are not reproduced.

The philosophical and historical Notes are condensed and adapted from a master's thesis on La Mettrie presented by Miss Bussey to the faculty of Wellesley College.

FREDERIC THE GREAT'S EULOGY ON JULIEN OFFRAY DE LA METTRIE.

FREDERIC THE GREAT'S EULOGY ON JULIEN OFFRAY DE LA METTRIE.

JULIEN Offray de la Mettrie was born in Saint Malo, on the twenty-fifth of December, 1709, to Julien Offray de la Mettrie and Marie Gaudron, who were living by a trade large enough to provide a good education for their son. They sent him to the college of Coutance to study the humanities; he went from there to Paris, to the college of Plessis; he studied his rhetoric at Caen, and since he had much genius and imagination, he won all the prizes for eloquence. He was a born orator, and was passionately fond of poetry and *belles-lettres,* but his father thought that he would earn more as an ecclesiastic than as a poet, and destined him for the church. He sent him, the following year, to the college of Plessis where he studied logic under M. Cordier, who was more a Jansenist than a logician.

It is characteristic of an ardent imagination to seize forcefully the objects presented to it, as it is characteristic of youth to be prejudiced in favor of the first opinions that are inculcated. Any other scholar would have adopted the opinions of his teacher but that was not enough for young La Mettrie; he became a Jansenist, and wrote a work which had great vogue in that party.

In 1725, he studied natural philosophy at the college of Harcourt, and made great progress there. On his return to Brittany, M. Hunault, a doctor of Saint Malo, had advised him to adopt the medical profession. They had persuaded his father, assuring him that a mediocre physician would be better paid for his remedies than a good priest for absolutions. At first young La Mettrie had applied himself to the study of anatomy: for two years he had worked at the dissecting-table. After this, in 1725, he took the degree of doctor at Rheims, and was there received as a physician.

In 1733, he went to Leyden to study under the famous Boerhaave. The master was worthy of the scholar and the scholar soon made himself worthy of the master. M. La Mettrie devoted all the acuteness of his mind to the knowledge and to the healing of human infirmities; and he soon became a great physician.

In the year 1734, during his leisure moments, he translated a treatise of the late M. Boerhaave, his *Aphrodisiacus,* and joined to it a dissertation on venereal maladies, of which he himself was the author. The old physicians in France rose up against a scholar who affronted them by knowing as much as they. One of the most celebrated doctors of Paris did him the honor of criticizing his work (a sure proof that it was good). La Mettrie replied; and, to confound his adversary still more, he composed in 1736 a treatise on vertigo, esteemed by all impartial physicians.

By an unfortunate effect of human imperfection a certain base jealousy has come to be one of the

characteristics of men of letters. This feeling incites those who have reputations, to oppose the progress of budding geniuses. This blight often fastens on talents without destroying them, but it sometimes injures them. M. La Mettrie, who was advancing in the career of science at a giant's pace, suffered from this jealousy, and his quick temper made him too susceptible to it.

In Saint Malo, be translated the "Aphorisms" of Boerhaave, the "Materia Medica", the "Chemical Proceedings", the "Chemical Theory", and the "Institutions", by this same author. About the same time, he published an abstract of Sydenham. The young doctor had learned by premature experience, that if he wished to live in peace, it was better to translate than to compose; but it is characteristic of genius to escape from reflection. Counting on himself alone, if I may speak thus, and filled with the knowledge he had gained from his infinitely skilful researches into nature, he wished to communicate to the public the useful discoveries he had made. He published his treatise on smallpox, his "Practical Medicine", and six volumes of commentary on the physiology of Boerhaave. All these works appeared at Paris, although the author had written them at Saint Malo. He joined to the theory of his art an always successful practice, which is no small recommendation for a physician.

In 1742, La Mettrie came to Paris, led there by the death of M. Hunault, his old teacher. Morand and Sidobre introduced him to the Duke of Gramont, who, a few days after, obtained for him the commission of physician of the guards.

He accompanied the Duke to war, and was with him at the battle of Dettingen, at the siege of Freiburg, and at the battle of Fontenoy, where he lost his patron, who was killed by a cannon shot.

La Mettrie felt this loss all the more keenly, because it was at the same time the reef on which his fortune was wrecked. This is what happened. During the campaign of Freiburg, La Mettrie had an attack of violent fever. For a philosopher an illness is a school of physiology; he believed that he could clearly see that thought is but a consequence of the organization of the machine, and that the disturbance of the springs has considerable influence on that part of us which the metaphysicians call soul. Filled with these ideas during his convalescence, he boldly bore the torch of experience into the night of metaphysics; he tried to explain by the aid of anatomy the thin texture of understanding, and he found only mechanism where others had supposed an essence superior to matter. He had his philosophic conjectures printed under the title of "The Natural History of the Soul". The chaplain of the regiment sounded the tocsin against him, and at first sight all the devotees cried out against him.

The common ecclesiastic is like Don Quixote, who found marvelous adventures in commonplace events, or like the famous soldier, so engrossed with his system that he found columns in all the books he read. The majority of priests examine all works of literature as if they were treatises on theology, and filled with this one aim, they

discover heresies everywhere. To this fact are due very many false judgments and very many accusations, for the most part unfair, against the authors. A book of physics should be read in the spirit of a physicist; nature, the truth, is its sole judge, and should absolve or condemn it. A book of astronomy should be read in the same manner. If a poor physician proves that the blow of a stick smartly rapped on the skull disturbs the mind, or that at a certain degree of heat reason wanders, one must either prove the contrary or keep quiet. If a skilful astronomer proves, in spite of Joshua, that the earth and all the celestial globes revolve around the sun, one must either calculate better than he, or admit that the earth revolves.

But the theologians, who, by their continual apprehension, might make the weak believe that their cause is bad, are not troubled by such a small matter. They insisted on finding seeds of heresy in a work dealing with physics. The author underwent a frightful persecution, and the priests claimed that a doctor accused of heresy could not cure the French guards.

To the hatred of the devotees was joined that of his rivals for glory. This was rekindled by a work of La Mettrie's entitled "The Politics of Physicians". A man full of cunning, and carried away by ambition, aspired to the place, then vacant, of first physician to the king of France. He thought that he could gain it by heaping ridicule upon those of his contemporaries who might lay claim to this position. He wrote a libel against them, and abusing the easy friendship of

La Mettrie, he enticed him to lend to it the volubility of his pen, and the richness of his imagination. Nothing more was needed to complete the downfall of a man little known, against whom were all appearances, and whose only protection was his merit.

For having been too sincere as a philosopher and too obliging as a friend, La Mettrie was compelled to leave his country. The Duke of Duras and the Viscount of Chaila advised him to flee from the hatred of the priests and the revenge of the physicians. Therefore, in 1746, he left the hospitals of the army where he had been placed by M. Sechelles, and came to Leyden to philosophize in peace. He there composed his "Penelope", a polemical work against the physicians in which, after the fashion of Democritus, he made fun of the vanity of his profession. The curious result was that the doctors themselves, though their quackery was painted in true colors, could not help laughing when they read it, and that is a sure sign that they had found more wit than malice in it.

M. La Mettrie after losing sight of his hospitals and his patients, gave himself up completely to speculative philosophy; he wrote his "Man a Machine" or rather he put on paper some vigorous thoughts about materialism, which he doubtless planned to rewrite. This work, which was bound to displease men who by their position are declared enemies of the progress of human reason, roused all the priests of Leyden against its author. Calvinists, Catholics and Lutherans forgot for the time that consubstan-

tiation, free will, mass for the dead, and the infallibility of the pope divided them: they all united again to persecute a philosopher who had the additional misfortune of being French, at a time when that monarchy was waging a successful war against their High Powers.

The title of philosopher and the reputation of being unfortunate were enough to procure for La Mettrie a refuge in Prussia with a pension from the king. He came to Berlin in the month of February in the year 1748; he was there received as a member of the Royal Academy of Science. Medicine reclaimed him from metaphysics, and he wrote a treatise on dysentery, another on asthma, the best that had been written on these cruel diseases. He sketched works on certain philosophical subjects which he had proposed to look into. By a sequence of accidents which befell him these works were stolen, but he demanded their suppression as soon as they appeared.

La Mettrie died in the house of Milord Tirconnel, minister plenipotentiary of France, whose life he had saved. It seems that the disease, knowing with whom it had to deal, was clever enough to attack his brain first, so that it would more surely confound him. He had a burning fever and was violently delirious. The invalid was obliged to depend upon the science of his colleagues, and he did not find there the resources which he had so often found in his own, both for himself and for the public.

He died on the eleventh of November, 1751, at the age of forty-three years. He had married

Louise Charlotte Dréano, by whom he left only a daughter, five years and a few months old.

La Mettrie was born with a fund of natural and inexhaustible gaiety; he had a quick mind, and such a fertile imagination that it made flowers grow in the field of medicine. Nature had made him an orator and a philosopher; but a yet more precious gift which he received from her, was a pure soul and an obliging heart. All those who are not imposed upon by the pious insults of the theologians mourn in La Mettrie a good man and a wise physician.

MAN A MACHINE.

MAN A MACHINE.

IT is not enough for a wise man to study nature and truth; he should dare state truth for the benefit of the few who are willing and able to think. As for the rest, who are voluntarily slaves of prejudice, they can no more attain truth, than frogs can fly.

I reduce to two the systems of philosophy which deal with man's soul. The first and older system is materialism; the second is spiritualism.

The metaphysicians who have hinted that matter may well be endowed with the faculty of thought[1] have perhaps not reasoned ill. For there is in this case a certain advantage in their inadequate way of expressing their meaning. In truth, to ask whether matter can think, without considering it otherwise than in itself, is like asking whether matter can tell time. It may be foreseen that we shall avoid this reef upon which Locke had the bad luck to make shipwreck.

The Leibnizians with their monads have set up an unintelligible hypothesis. They have rather spiritualized matter than materialized the soul. How can we define a being whose nature is absolutely unknown to us?[2]

Descartes and all the Cartesians, among whom the followers of Malebranche have long been

numbered, have made the same mistake. They have taken for granted two distinct substances in man, as if they had seen them, and positively counted them.

The wisest men have declared that the soul can not know itself save by the light of faith. However, as reasonable beings they have thought that they could reserve for themselves the right of examining what the Bible means by the word "spirit", which it uses in speaking of the human soul. And if in their investigation, they do not agree with the theologians on this point, are the theologians more in agreement among themselves on all other points?

Here is the result in a few words, of all their reflections. If there is a God, He is the Author of nature as well as of revelation. He has given us the one to explain the other, and reason to make them agree.

To distrust the knowledge that can be drawn from the study of animated bodies, is to regard nature and revelation as two contraries which destroy each the other, and consequently to dare uphold the absurd doctrine, that God contradicts Himself in His various works and deceives us.

If there is a revelation, it can not then contradict nature. By nature only can we understand the meaning of the words of the Gospel, of which experience is the only true interpreter. In fact, the commentators before our time have only obscured the truth. We can judge of this by the author of the "Spectacle of Nature".[3] "It is astonishing", he says concerning Locke, "that a man who degrades our soul far enough to con-

sider it a soul of clay should dare set up reason as judge and sovereign arbiter of the mysteries of faith, for", he adds, "what an astonishing idea of Christianity one would have, if one were to follow reason".

Not only do these reflections fail to elucidate faith, but they also constitute such frivolous objections to the method of those who undertake to interpret the Scripture, that I am almost ashamed to waste time in refuting them.

The excellence of reason does not depend on a big word devoid of meaning (immateriality), but on the force, extent, and perspicuity of reason itself. Thus a "soul of clay" which should discover, at one glance, as it were, the relations and the consequences of an infinite number of ideas hard to understand, would evidently be preferable to a foolish and stupid soul, though that were composed of the most precious elements. A man is not a philosopher because, with Pliny, he blushes over the wretchedness of our origin. What seems vile is here the most precious of things, and seems to be the object of nature's highest art and most elaborate care. But as man, even though he should come from an apparently still more lowly source, would yet be the most perfect of all beings, so whatever the origin of his soul, if it is pure, noble, and lofty, it is a beautiful soul which dignifies the man endowed with it.

Pluche's second way of reasoning seems vicious to me, even in his system, which smacks a little of fanaticism; for [on his view] if we have an idea of faith as being contrary to the clearest

principles, to the most incontestable truths, we must yet conclude, out of respect for revelation and its author, that this conception is false, and that we do not yet understand the meaning of the words of the Gospel.

Of the two alternatives, only one is possible: either everything is illusion, nature as well as revelation, or experience alone can explain faith. But what can be more ridiculous than the position of the author! Can one imagine hearing a Peripatetic say, "We ought not to accept the experiments of Torricelli,[4] for if we should accept them, if we should rid ourselves of the horror of the void, what an astonishing philosophy we should have!"

I have shown how vicious the reasoning of Pluche is* in order to prove, in the first place, that if there is a revelation, it is not sufficiently demonstrated by the mere authority of the Church, and without any appeal to reason, as all those who fear reason claim: and in the second place, to protect against all assault the method of those who would wish to follow the path that I open to them, of interpreting supernatural things, incomprehensible in themselves, in the light of those ideas with which nature has endowed us. Experience and observation should therefore be our only guides here. Both are to be found throughout the records of the physicians who were philosophers, and not in the works of the philosophers who were not physicians. The former have traveled through and illuminated the labyrinth of man; they alone have laid bare to us those springs [of life] hidden under the ex-

ternal integument which conceals so many wonders from our eyes. They alone, tranquilly contemplating our soul, have surprised it, a thousand times, both in its wretchedness and in its glory, and they have no more despised it in the first estate, than they have admired it in the second. Thus, to repeat, only the physicians have a right to speak on this subject.[5] What could the others, especially the theologians, have to say? Is it not ridiculous to hear them shamelessly coming to conclusions about a subject concerning which they have had no means of knowing anything, and from which on the contrary they have been completely turned aside by obscure studies that have led them to a thousand prejudiced opinions, —in a word, to fanaticism, which adds yet more to their ignorance of the mechanism of the body?

But even though we have chosen the best guides, we shall still find many thorns and stumbling blocks in the way.

Man is so complicated a machine[6] that it is impossible to get a clear idea of the machine beforehand, and hence impossible to define it. For this reason, all the investigations have been vain, which the greatest philosophers have made *à priori*, that is, to say, in so far as they use, as it were, the wings of the spirit. Thus it is only *à posteriori* or by trying to disentangle the soul from the organs of the body, so to speak, that one can reach the highest probability concerning man's own nature, even though one can not discover with certainty what his nature is.

Let us then take in our hands the staff of ex-

*He evidently errs by begging the question.

perience,[7] paying no heed to the accounts of all the idle theories of philosophers. To be blind and to think that one can do without this staff is the worst kind of blindness. How truly a contemporary writer says that only vanity fails to gather from secondary causes the same lessons as from primary causes! One can and one even ought to admire all these fine geniuses in their most useless works, such men as Descartes, Malebranche, Leibniz, Wolff and the rest, but what profit, I ask, has any one gained from their profound meditations, and from all their works? Let us start out then to discover not what has been thought, but what must be thought for the sake of repose in life.

There are as many different minds, different characters, and different customs, as there are different temperaments. Even Galen[8] knew this truth which Descartes carried so far as to claim that medicine alone can change minds and morals, along with bodies. (By the writer of "L'histoire de l'ame,"[9] this teaching is incorrectly attributed to Hippocrates.[10]) It is true that meloncholy, bile, phlegm, blood etc.—according to the nature, the abundance, and the different combination of these humors—make each man different from another.[11]

In disease the soul is sometimes hidden, showing no sign of life; sometimes it is so inflamed by fury that it seems to be doubled; sometimes, imbecility vanishes and the convalescence of an idiot produces a wise man. Sometimes, again, the greatest genius becomes imbecile and loses the sense of self. Adieu then to all that fine knowl-

edge, acquired at so high a price, and with so much trouble! Here is a paralytic who asks if his leg is in bed with him; there is a soldier who thinks that he still has the arm which has been cut off. The memory of his old sensations, and of the place to which they were referred by his soul, is the cause of his illusion, and of this kind of delirium. The mere mention of the member which he has lost is enough to recall it to his mind, and to make him feel all its motions; and this causes him an indefinable and inexpressible kind of imaginary suffering. This man cries like a child at death's approach, while this other jests. What was needed to change the bravery of Caius Julius, Seneca, or Petronius into cowardice or faintheartedness? Merely an obstruction in the spleen, in the liver, an impediment in the portal vein? Why? Because the imagination is obstructed along with the viscera, and this gives rise to all the singular phenomena of hysteria and hypochondria.

What can I add to the stories already told of those who imagine themselves transformed into wolf-men, cocks or vampires, or of those who think that the dead feed upon them? Why should I stop to speak of the man who imagines that his nose or some other member is of glass? The way to help this man regain his faculties and his own flesh-and-blood nose is to advise him to sleep on hay, lest he break the fragile organ, and then to set fire to the hay that he may be afraid of being burned—a fear which has sometimes cured paralysis. But I must touch lightly on facts which everybody knows.

Neither shall I dwell long on the details of the effects of sleep. Here a tired soldier snores in a trench, in the middle of the thunder of hundreds of cannon. His soul hears nothing; his sleep is as deep as apoplexy. A bomb is on the point of crushing him. He will feel this less perhaps than he feels an insect which is under his foot.

On the other hand, this man who is devoured by jealousy, hatred, avarice, or ambition, can never find any rest. The most peaceful spot, the freshest and most calming drinks are alike useless to one who has not freed his heart from the torment of passion.

The soul and the body fall asleep together. As the motion of the blood is calmed, a sweet feeling of peace and quiet spreads through the whole mechanism. The soul feels itself little by little growing heavy as the eyelids droop, and loses its tenseness, as the fibres of the brain relax; thus little by little it becomes as if paralyzed and with it all the muscles of the body. These can no longer sustain the weight of the head, and the soul can no longer bear the burden of thought; it is in sleep as if it were not.

Is the circulation too quick? the soul cannot sleep. Is the soul too much excited? the blood can not be quieted: it gallops through the veins with an audible murmur. Such are the two opposite causes of insomnia. A single fright in the midst of our dreams makes the heart beat at double speed and snatches us from needed and delicious repose, as a real grief or an urgent need would do. Lastly as the mere cessation of the functions of the soul produces sleep, there

are, even when we are awake (or at least when we are half awake), kinds of very frequent short naps of the mind, vergers' dreams, which show that the soul does not always wait for the body to sleep. For if the soul is not fast asleep, it surely is not far from sleep, since it can not point out a single object to which it has attended, among the uncounted number of confused ideas which, so to speak, fill the atmosphere of our brains like clouds.

Opium is too closely related to the sleep it produces, to be left out of consideration here. This drug intoxicates, like wine, coffee, etc., each in its own measure and according to the dose.[12] It makes a man happy in a state which would seemingly be the tomb of feeling, as it is the image of death. How sweet is this lethargy! The soul would long never to emerge from it. For the soul has been a prey to the most intense sorrow, but now feels only the joy of suffering past, and of sweetest peace. Opium even alters the will, forcing the soul which wished to wake and to enjoy life, to sleep in spite of itself. I shall omit any reference to the effect of poisons.

Coffee, the well-known antidote for wine, by scourging the imagination, cures our headaches and scatters our cares without laying up for us, as wine does, other headaches for the morrow. But let us contemplate the soul in its other needs.

The human body is a machine which winds its own springs. It is the living image of perpetual movement. Nourishment keeps up the movements which fever excites. Without food, the soul pines away, goes mad, and dies exhausted. The soul is

a taper whose light flares up the moment before it goes out. But nourish the body, pour into its veins life-giving juices and strong liquors, and then the soul grows strong like them, as if arming itself with a proud courage, and the soldier whom water would have made flee, grows bold and runs joyously to death to the sound of drums. Thus a hot drink sets into stormy movement the blood which a cold drink would have calmed.

What power there is in a meal! Joy revives in a sad heart, and infects the souls of comrades, who express their delight in the friendly songs in which the Frenchman excels. The melancholy man alone is dejected, and the studious man is equally out of place [in such company].

Raw meat makes animals fierce, and it would have the same effect on man. This is so true that the English who eat meat red and bloody, and not as well done as ours, seem to share more or less in the savagery due to this kind of food, and to other causes which can be rendered ineffective by education only. This savagery creates in the soul, pride, hatred, scorn of other nations, indocility and other sentiments which degrade the character, just as heavy food makes a dull and heavy mind whose usual traits are laziness and indolence.

Pope understood well the full power of greediness when he said:[13]

> "Catius is ever moral, ever grave,
> Thinks who endures a knave is next a knave,
> Save just at dinner—then prefers no doubt,
> A rogue with ven'son to a saint without."

Elsewhere he says:

"See the same man in vigor, in the gout
Alone, in company, in place or out,
Early at business and at hazard late,
Mad at a fox chase, wise at a debate,
Drunk at a borough, civil at a ball,
Friendly at Hackney, faithless at White Hall."

In Switzerland we had a bailiff by the name of M. Steigner de Wittighofen. When he fasted he was a most upright and even a most indulgent judge, but woe to the unfortunate man whom he found on the culprit's bench after he had had a large dinner! He was capable of sending the innocent like the guilty to the gallows.

We think we are, and in fact we are, good men, only as we are gay or brave; everything depends on the way our machine is running. One is sometimes inclined to say that the soul is situated in the stomach, and that in Van Helmont,[14] who said that the seat of the soul was in the pylorus, made only the mistake of taking the part for the whole.

To what excesses cruel hunger can bring us! We no longer regard even our own parents and children. We tear them to pieces eagerly and make horrible banquets of them; and in the fury with which we are carried away, the weakest is always the prey of the strongest.....

One needs only eyes to see the necessary influence of old age on reason. The soul follows the progress of the body, as it does the progress of education. In the weaker sex, the soul accords also with delicacy of temperament, and from this delicacy follow tenderness, affection, quick feelings due more to passion than to reason, prejudices, and superstitions, whose strong

impress can hardly be effaced. Man, on the other hand, whose brain and nerves partake of the firmness of all solids, has not only stronger features but also a more vigorous mind. Education, which women lack, strengthens his mind still more. Thus with such help of nature and art, why should not a man be more grateful, more generous, more constant in friendship, stronger in adversity? But, to follow almost exactly the thought of the author of the "Lettres sur la Physiognomie,"[15] the sex which unites the charms of the mind and of the body with almost all the tenderest and most delicate feelings of the heart, should not envy us the two capacities which seem to have been given to man, the one merely to enable him better to fathom the allurements of beauty, and the other merely to enable him to minister better to its pleasures.

It is no more necessary to be just as great a physiognomist as this author, in order to guess the quality of the mind from the countenance or the shape of the features, provided these are sufficiently marked, than it is necessary to be a great doctor to recognize a disease accompanied by all its marked symptoms. Look at the portraits of Locke, of Steele, of Boerhaave,[16] of Maupertuis,[17] and the rest, and you will not be surprised to find strong faces and eagle eyes. Look over a multitude of others, and you can always distinguish the man of talent from the man of genius, and often even an honest man from a scoundrel. For example, it has been noticed that a celebrated poet combines (in his

portrait) the look of a pickpocket with the fire of Prometheus.

History provides us with a noteworthy example of the power of temperature. The famous Duke of Guise was so strongly convinced that Henry the Third, in whose power he had so often been, would never dare assassinate him, that he went to Blois. When the Chancelor Chiverny learned of the duke's departure, he cried, "He is lost". After this fatal prediction had been fulfilled by the event, Chiverny was asked why he made it. "I have known the king for twenty years," said he; "he is naturally kind and even weakly indulgent, but I have noticed that when it is cold, it takes nothing at all to provoke him and send him into a passion."

One nation is of heavy and stupid wit, and another quick, light and penetrating. Whence comes this difference, if not in part from the difference in foods, and difference in inheritance,* and in part from the mixture of the diverse elements which float around in the immensity of the void? The mind, like the body, has its contagious diseases and its scurvy.

Such is the influence of climate, that a man who goes from one climate to another, feels the change, in spite of himself. He is a walking plant which has transplanted itself; if the climate is not the same, it will surely either degenerate or improve.

Furthermore, we catch everything from those

*The history of animals and of men proves how the mind and the body of children are dominated by their inheritance from their fathers.

with whom we come in contact; their gestures, their accent, etc.; just as the eyelid is instinctively lowered when a blow is foreseen, or as (for the same reason) the body of the spectator mechanically imitates, in spite of himself, all the motions of a good mimic.[18]

From what I have just said, it follows that a brilliant man is his own best company, unless he can find other company of the same sort. In the society of the unintelligent, the mind grows rusty for lack of exercise, as at tennis a ball that is served badly is badly returned. I should prefer an intelligent man without an education, if he were still young enough, to a man badly educated. A badly trained mind is like an actor whom the provinces have spoiled.

Thus, the diverse states of the soul are always correlative with those of the body.[19] But the better to show this dependence, in its completeness and its causes, let us here make use of comparative anatomy; let us lay bare the organs of man and of animals. How can human nature be known, if we may not derive any light from an exact comparison of the structure of man and of animals?

In general, the form and the structure of the brains of quadrupeds are almost the same as those of the brain of man; the same shape, the same arrangement everywhere, with this essential difference, that of all the animals man is the one whose brain is largest, and, in proportion to its mass, more convoluted than the brain of any other animal; then come the monkey, the beaver, the elephant, the dog, the fox, the cat. These

animals are most like man, for among them, too, one notes the same progressive analogy in relation to the *corpus callosum* in which Lancisi—anticipating the late M. de la Peyronie[20]—established the seat of the soul. The latter, however, illustrated the theory by innumerable experiments. Next after all the quadrupeds, birds have the largest brains. Fish have large heads, but these are void of sense, like the heads of many men. Fish have no *corpus callosum*, and very little brain, while insects entirely lack brain.

I shall not launch out into any more detail about the varieties of nature, nor into conjectures concerning them, for there is an infinite number of both, as any one can see by reading no further than the treatises of Willis "De Cerebro" and "De Anima Brutorum."[21]

I shall draw the conclusions which follow clearly from these incontestable observations: 1st, that the fiercer animals are, the less brain they have; 2d, that this organ seems to increase in size in proportion to the gentleness of the animal; 3d, that nature seems here eternally to impose a singular condition, that the more one gains in intelligence the more one loses in instinct. Does this bring gain or loss?

Do not think, however, that I wish to infer by that, that the size alone of the brain, is enough to indicate the degree of tameness in animals: the quality must correspond to the quantity, and the solids and liquids must be in that due equilibrium which constitutes health.

If, as is ordinarily observed, the imbecile does not lack brain, his brain will be deficient in its

consistency—for instance, in being too soft. The same thing is true of the insane, and the defects of their brains do not always escape our investigation. But if the causes of imbecility, insanity, etc., are not obvious, where shall we look for the causes of the diversity of all minds? They would escape the eyes of a lynx and of an argus. A mere nothing, a tiny fibre, something that could never be found by the most delicate anatomy, would have made of Erasmus and Fontenelle[22] two idiots, and Fontenelle himself speaks of this very fact in one of his best dialogues.

Willis has noticed in addition to the softness of the brain-substance in children, puppies, and birds, that the *corpora striata* are obliterated and discolored in all these animals, and that the striations are as imperfectly formed as in paralytics.....

However cautious and reserved one may be about the consequences that can be deduced from these observations, and from many other concerning the kind of variation in the organs, nerves, etc., [one must admit that] so many different varieties can not be the gratuitous play of nature. They prove at least the necessity for a good and vigorous physical organization, since throughout the animal kingdom the soul gains force with the body and acquires keenness, as the body gains strength.

Let us pause to contemplate the varying capacity of animals to learn. Doubtless the analogy best framed leads the mind to think that the causes we have mentioned produce all the difference that is found between animals and men,

although we must confess that our weak understanding, limited to the coarsest observations, can not see the bonds that exist between cause and effects. This is a kind of harmony that philosophers will never know.

Among animals, some learn to speak and sing; they remember tunes, and strike the notes as exactly as a musician. Others, for instance the ape, show more intelligence, and yet can not learn music. What is the reason for this, except some defect in the organs of speech? But is this defect so essential to the structure that it could never be remedied? In a word, would it be absolutely impossible to teach the ape a language?[23] I do not think so.

I should choose a large ape in preference to any other, until by some good fortune another kind should be discovered, more like us, for nothing prevents there being such an one in regions unknown to us. The ape resembles us so strongly that naturalists have called it "wild man" or "man of the woods". I should take it in the condition of the pupils of Amman,[24] that is to say, I should not want it to be too young or too old; for apes that are brought to Europe are usually too old. I would choose the one with the most intelligent face, and the one which, in a thousand little ways, best lived up to its look of intelligence. Finally not considering myself worthy to be his master, I should put him in the school of that excellent teacher whom I have just named, or with another teacher equally skilful, if there is one.

You know by Amman's work, and by all those* who have interpreted his method, all the wonders he has been able to accomplish for those born deaf. In their eyes he discovered ears, as he himself explains, and in how short a time! In short he taught them to hear, speak, read, and write. I grant that a deaf person's eyes see more clearly and are keener than if he were not deaf, for the loss of one member or sense can increase the strength or acuteness of another, but apes see and hear, they understand what they hear and see, and grasp so perfectly the signs that are made to them, that I doubt not that they would surpass the pupils of Amman in any other game or exercise. Why then should the education of monkeys be impossible? Why might not the monkey, by dint of great pains, at last imitate after the manner of deaf mutes, the motions necessary for pronunciation? I do not dare decide whether the monkey's organs of speech, however trained, would be incapable of articulation. But, because of the great analogy between ape and man[25] and because there is no known animal whose external and internal organs so strikingly resemble man's, it would surprise me if speech were absolutely impossible to the ape. Locke, who was certainly never suspected of credulity, found no difficulty in believing the story told by Sir William Temple[26] in his memoirs, about a parrot which could answer rationally, and which had learned to carry on a kind of connected conversation, as we do. I know that

*The author of "The History of the Soul."

people have ridiculed* this great metaphysician; but suppose some one should have announced that reproduction sometimes takes place without eggs or a female, would he have found many partisans? Yet M. Trembley[27] has found cases where reproduction takes place without copulation and by fission. Would not Amman too have passed for mad if he had boasted that he could instruct scholars like his in so short a time, before he had happily accomplished the feat? His successes have, however, astonished the world; and he, like the author of "The History of Polyps", has risen to immortality at one bound. Whoever owes the miracles that he works to his own genius surpasses, in my opinion, the man who owes his to chance. He who has discovered the art of adorning the most beautiful of the kingdoms [of nature], and of giving it perfections that it did not have, should be rated above an idle creator of frivolous systems, or a painstaking author of sterile discoveries. Amman's discoveries are certainly of a much greater value; he has freed men from the instinct to which they seemed to be condemned, and has given them ideas, intelligence, or in a word, a soul which they would never have had. What greater power than this!

Let us not limit the resources of nature; they are infinite, especially when reinforced by great art.

Could not the device which opens the Eustachian canal of the deaf, open that of apes? Might not a happy desire to imitate the master's pronunciation, liberate the organs of speech in animals

*The author of "The Natural History of the Soul."

that imitate so many other signs with such skill and intelligence? Not only do I defy any one to name any really conclusive experiment which proves my view impossible and absurd; but such is the likeness of the structure and functions of the ape to ours that I have very little doubt that if this animal were properly trained he might at last be taught to pronounce, and consequently to know, a language. Then he would no longer be a wild man, nor a defective man, but he would be a perfect man, a little gentleman, with as much matter or muscle as we have, for thinking and profiting by his education.

The transition from animals to man is not violent, as true philosophers will admit. What was man before the invention of words and the knowledge of language?[28] An animal of his own species with much less instinct than the others. In those days, he did not consider himself king over the other animals, nor was he distinguished from the ape, and from the rest, except as the ape itself differs from the other animals, i. e., by a more intelligent face. Reduced to the bare intuitive knowledge of the Leibnizians he saw only shapes and colors, without being able to distinguish between them: the same, old as young, child at all ages, he lisped out his sensations and his needs, as a dog that is hungry or tired of sleeping, asks for something to eat, or for a walk.

Words, languages, laws, sciences, and the fine arts have come, and by them finally the rough diamond of our mind has been polished. Man has been trained in the same way as animals. He has become an author, as they became beasts

of burden. A geometrician has learned to perform the most difficult demonstrations and calculations, as a monkey has learned to take his little hat off and on, and to mount his tame dog. All has been accomplished through signs, every species has learned what it could understand, and in this way men have acquired symbolic knowledge, still so called by our German philosophers.

Nothing, as any one can see, is so simple as the mechanism of our education. Everything may be reduced to sounds or words that pass from the mouth of one through the ears of another into his brain. At the same moment, he perceives through his eyes the shape of the bodies of which these words are the arbitrary signs.

But who was the first to speak? Who was the first teacher of the human race? Who invented the means of utilizing the plasticity of our organism? I can not answer: the names of these first splendid geniuses have been lost in the night of time. But art is the child of nature, so nature must have long preceded it.

We must think that the men who were the most highly organized, those on whom nature had lavished her richest gifts, taught the others. They could not have heard a new sound for instance, nor experienced new sensations, nor been struck by all the varied and beautiful objects that compose the ravishing spectacle of nature without finding themselves in the state of mind of the deaf man of Chartres, whose experience was first related by the great Fontenelle,[29] when,

at forty years, he heard for the first time, the astonishing sound of bells.

Would it be absurd to conclude from this that the first mortals tried after the manner of this deaf man, or like animals and like mutes (another kind of animals), to express their new feelings by motions depending on the nature of their imagination, and therefore afterwards by spontaneous sounds, distinctive of each animal, as the natural expression of their surprise, their joy, their ecstasies and their needs? For doubtless those whom nature endowed with finer feeling had also greater facility in expression.

That is the way in which, I think, men have used their feeling and their instinct to gain intelligence and then have employed their intelligence to gain knowledge. Those are the ways, so far as I can understand them, in which men have filled the brain with the ideas, for the reception of which nature made it. Nature and man have helped each other; and the smallest beginnings have, little by little, increased, until everything in the universe could be as easily described as a circle.

As a violin string or a harpsichord key vibrates and gives forth sound, so the cerebral fibres, struck by waves of sound, are stimulated to render or repeat the words that strike them. And as the structure of the brain is such that when eyes well formed for seeing, have once perceived the image of objects, the brain can not help seeing their images and their differences, so when the signs of these differences have been traced or imprinted in the brain, the soul necessarily

examines their relations—an examination that would have been impossible without the discovery of signs or the invention of language. At the time when the universe was almost dumb, the soul's attitude toward all objects was that of a man without any idea of proportion toward a picture or a piece of sculpture, in which he could distinguish nothing; or the soul was like a little child (for the soul was then in its infancy) who, holding in his hand small bits of straw or wood, sees them in a vague and superficial way without being able to count or distinguish them. But let some one attach a kind of banner, or standard, to this bit of wood (which perhaps is called a mast), and another banner to another similar object; let the first be known by the symbol 1, and the second by the symbol or number 2, then the child will be able to count the objects, and in this way he will learn all of arithmetic. As soon as one figure seems equal to another in its numerical sign, he will decide without difficulty that they are two different bodies, that 1 + 1 make 2, and 2 + 2 make 4,* etc.

This real or apparent likeness of figures is the fundamental basis of all truths and of all we know. Among these sciences, evidently those whose signs are less simple and less sensible are harder to understand than the others, because more talent is required to comprehend and combine the immense number of words by which such sciences express the truths in their province. On the other hand, the sciences that are ex-

*There are peoples, even to-day, who, through lack of a greater number of signs, can count only to 20.

pressed by numbers or by other small signs, are easily learned; and without doubt this facility rather than its demonstrability is what has made the fortune of algebra.

All this knowledge, with which vanity fills the balloon-like brains of our proud pedants, is therefore but a huge mass of words and figures, which form in the brain all the marks by which we distinguish and recall objects. All our ideas are awakened after the fashion in which the gardener who knows plants recalls all stages of their growth at sight of them. These words and the objects designated by them are so connected in the brain that it is comparatively rare to imagine a thing without the name or sign that is attached to it.

I always use the word "imagine", because I think that everything is the work of imagination, and that all the faculties of the soul can be correctly reduced to pure imagination in which they all consist.[30] Thus judgment, reason, and memory are not absolute parts of the soul, but merely modifications of this kind of medullary screen upon which images of the objects painted in the eye are projected as by a magic lantern.

But if such is the marvelous and incomprehensible result of the structure of the brain, if everything is perceived and explained by imagination, why should we divide the sensitive principle which thinks in man? Is not this a clear inconsistency in the partisans of the simplicity of the mind? For a thing that is divided can no longer without absurdity be regarded as indivisible. See to what one is brought by the

abuse of language and by those fine words (spirituality, immateriality, etc.) used haphazard and not understood even by the most brilliant.[31]

Nothing is easier than to prove a system based, as this one is, on the intimate feeling and personal experience of each individual. If the imagination, or, let us say, that fantastic part of the brain whose nature is as unknown to us as its way of acting, be naturally small or weak, it will hardly be able to compare the analogy or the resemblance of its ideas, it will be able to see only what is face to face with it, or what affects it very strongly; and how will it see all this! Yet it is always imagination which apperceives, and imagination which represents to itself all objects along with their names and symbols; and thus, once again, imagination is the soul, since it plays all the rôles of the soul. By the imagination, by its flattering brush, the cold skeleton of reason takes on living and ruddy flesh; by the imagination the sciences flourish, the arts are adorned, the wood speaks, the echoes sigh, the rocks weep, marble breathes, and all inanimate objects gain life. It is imagination again which adds the piquant charm of voluptuousness to the tenderness of an amorous heart; which makes tenderness bud in the study of the philosopher and of the dusty pedant, which, in a word, creates scholars as well as orators and poets. Foolishly decried by some, vainly praised by others, and misunderstood by all; it follows not only in the train of the graces and of the fine arts, it not only describes, but can also measure nature. It reasons, judges, analyzes, compares, and investi-

gates. Could it feel so keenly the beauties of the pictures drawn for it, unless it discovered their relations? No, just as it can not turn its thoughts on the pleasures of the senses, without enjoying their perfection or their voluptuousness, it can not reflect on what it has mechanically conceived, without thus being judgment itself.

The more the imagination or the poorest talent is exercised, the more it gains in *embonpoint,* so to speak, and the larger it grows. It becomes sensitive, robust, broad, and capable of thinking. The best of organisms has need of this exercise.

Man's preeminent advantage is his organism.[32] In vain all writers of books on morals fail to regard as praiseworthy those qualities that come by nature, esteeming only the talents gained by dint of reflection and industry. For whence come, I ask, skill, learning, and virtue, if not from a disposition that makes us fit to become skilful, wise and virtuous? And whence again, comes this disposition, if not from nature? Only through nature do we have any good qualities; to her we owe all that we are. Why then should I not esteem men with good natural qualities as much as men who shine by acquired and as it were borrowed virtues? Whatever the virtue may be, from whatever source it may come, it is worthy of esteem; the only question is, how to estimate it. Mind, beauty, wealth, nobility, although the children of chance, all have their own value, as skill, learning and virtue have theirs. Those upon whom nature has heaped her most costly gifts should pity those to whom these gifts have been refused; but, in their character of experts,

they may feel their superiority without pride. A beautiful woman would be as foolish to think herself ugly, as an intelligent man to think himself a fool. An exaggerated modesty (a rare fault, to be sure) is a kind of ingratitude towards nature. An honest pride, on the contrary, is the mark of a strong and beautiful soul, revealed by manly features moulded by feeling.

If one's organism is an advantage, and the preeminent advantage, and the source of all others, education is the second. The best made brain would be a total loss without it, just as the best constituted man would be but a common peasant, without knowledge of the ways of the world. But, on the other hand, what would be the use of the most excellent school, without a matrix perfectly open to the entrance and conception of ideas? It is....impossible to impart a single idea to a man deprived of all his senses.....

But if the brain is at the same time well organized and well educated, it is a fertile soil, well sown, that brings forth a hundredfold what it has received: or (to leave the figures of speech often needed to express what one means, and to add grace to truth itself) the imagination, raised by art to the rare and beautiful dignity of genius, apprehends exactly all the relations of the ideas it has conceived, and takes in easily an astounding number of objects, in order to deduce from them a long chain of consequences, which are again but new relations, produced by a comparison with the first, to which the soul finds a perfect resemblance. Such is, I think, the generation of intelligence.[33] I say "finds" as I be-

fore gave the epithet "apparent" to the likeness of objects, not because I think that our senses are always deceivers, as Father Malebranche has claimed, or that our eyes, naturally a little unsteady, fail to see objects as they are in themselves, (though microscopes prove this to us every day) but in order to avoid any dispute with the Pyrrhonians,[34] among whom Bayle[35] is well known.

I say of truth in general what M. de Fontenelle says of certain truths in particular, that we must sacrifice it in order to remain on good terms with society. And it accords with the gentleness of my character, to avoid all disputes unless to whet conversation. The Cartesians would here in vain make an onset upon me with their innate ideas. I certainly would not give myself a quarter of the trouble that M. Locke took, to attack such chimeras. In truth, what is the use of writing a ponderous volume to prove a doctrine which became an axiom three thousand years ago?

According to the principles which we have laid down, and which we consider true; he who has the most imagination should be regarded as having the most intelligence or genius, for all these words are synonymous; and again, only by a shameful abuse [of terms] do we think that we are saying different things, when we are merely using different words, different sounds, to which no idea or real distinction is attached.

The finest, greatest, or strongest imagination is then the one most suited to the sciences as well as to the arts. I do not pretend to say

whether more intellect is necessary to excel in the art of Aristotle or of Descartes than to excel in that of Euripides or of Sophocles, and whether nature has taken more trouble to make Newton than to make Corneille, though I doubt this. But it is certain that imagination alone, differently applied, has produced their diverse triumphs and their immortal glory.

If one is known as having little judgment and much imagination, this means that the imagination has been left too much alone, has, as it were, occupied most of the time in looking at itself in the mirror of its sensations, has not sufficiently formed the habit of examining the sensations themselves attentively. [It means that the imagination] has been more impressed by images than by their truth or their likeness.

Truly, so quick are the responses of the imagination that if attention, that key or mother of the sciences, does not do its part, imagination can do little more than run over and skim its objects.

See that bird on the bough: it seems always ready to fly away. Imagination is like the bird, always carried onward by the turmoil of the blood and the animal spirits. One wave leaves a mark, effaced by the one that follows; the soul pursues it, often in vain: it must expect to regret the loss of that which it has not quickly enough seized and fixed. Thus, imagination, the true image of time, is being ceaselessly destroyed and renewed.

Such is the chaos and the continuous quick succession of our ideas: they drive each other

away even as one wave yields to another. Therefore, if imagination does not, as it were, use one set of its muscles to maintain a kind of equilibrium with the fibres of the brain, to keep its attention for a while upon an object that is on the point of disappearing, and to prevent itself from contemplating prematurely another object—[unless the imagination does all this], it will never be worthy of the fine name of judgment. It will express vividly what it has perceived in the same fashion: it will create orators, musicians, painters, poets, but never a single philosopher. On the contrary, if the imagination be trained from childhood to bridle itself and to keep from being carried away by its own impetuosity—an impetuosity which creates only brilliant enthusiasts—and to check, to restrain, its ideas, to examine them in all their aspects in order to see all sides of an object, then the imagination, ready in judgment, will comprehend the greatest possible sphere of objects, through reasoning; and its vivacity (always so good a sign in children, and only needing to be regulated by study and training) will be only a far-seeing insight without which little progress can be made in the sciences.

Such are the simple foundations upon which the edifice of logic has been reared. Nature has built these foundations for the whole human race, but some have used them, while others have abused them.

In spite of all these advantages of man over animals, it is doing him honor to place him in the same class. For, truly, up to a certain age,

he is more of an animal than they, since at birth he has less instinct. What animal would die of hunger in the midst of a river of milk? Man alone. Like that child of olden time to whom a modern writer, refers, following Arnobius,[36] he knows neither the foods suitable for him, nor the water that can drown him, nor the fire that can reduce him to ashes. Light a wax candle for the first time under a child's eyes, and he will mechanically put his fingers in the flame as if to find out what is the new thing that he sees. It is at his own cost that he will learn of the danger, but he will not be caught again. Or, put the child with an animal on a precipice, the child alone falls off; he drowns where the animal would save itself by swimming. At fourteen or fifteen years the child knows hardly anything of the great pleasures in store for him, in the reproduction of his species; when he is a youth, he does not know exactly how to behave in a game which nature teaches animals so quickly. He hides himself as if he were ashamed of taking pleasure, and of having been made to be happy, while animals frankly glory in being cynics. Without education, they are without prejudices. For one more example, let us observe a dog and a child who have lost their master on a highway: the child cries and does not know to what saint to pray, while the dog, better helped by his sense of smell than the child by his reason, soon finds his master.

Thus nature made us to be lower than animals or at least to exhibit all the more, because of that native inferiority, the wonderful efficacy of

education which alone raises us from the level of the animals and lifts us above them. But shall we grant this same distinction to the deaf and to the blind, to imbeciles, madmen, or savages, or to those who have been brought up in the woods with animals; to those who have lost their imagination through melancholia, or in short to all those animals in human form who give evidence of only the rudest instinct? No, all these, men of body but not of mind, do not deserve to be classed by themselves.

We do not intend to hide from ourselves the arguments that can be brought forward against our belief and in favor of a primitive distinction between men and animals. Some say that there is in man a natural law, a knowledge of good and evil, which has never been imprinted on the heart of animals.

But is this objection, or rather this assertion, based on observation? Any assertion unfounded on observation may be rejected by a philosopher. Have we ever had a single experience which convinces us that man alone has been enlightened by a ray denied all other animals? If there is no such experience, we can no more know what goes on in animals' minds or even in the minds of other men, than we can help feeling what affects the inner part of our own being. We know that we think, and feel remorse—an intimate feeling forces us to recognize this only too well; but this feeling in us is insufficient to enable us to judge the remorse of others. That is why we have to take others at their word, or judge them by the sensible and external signs we have noticed in

ourselves when we experienced the same accusations of conscience and the same torments.

In order to decide whether animals which do not talk have received the natural law, we must, therefore, have recourse to those signs to which I have just referred, if any such exist. The facts seem to prove it. A dog that bit the master who was teasing it, seemed to repent a minute afterwards; it looked sad, ashamed, afraid to show itself, and seemed to confess its guilt by a crouching and downcast air. History offers us a famous example of a lion which would not devour a man abandoned to its fury, because it recognized him as its benefactor. How much might it be wished that man himself always showed the same gratitude for kindnesses, and the same respect for humanity! Then we should no longer fear either ungrateful wretches, or wars which are the plague of the human race and the real executioners of the natural law.

But a being to which nature has given such a precocious and enlightened instinct, which judges, combines, reasons, and deliberates as far as the sphere of its activity extends and permits, a being which feels attachment because of benefits received, and which leaving a master who treats it badly goes to seek a better one, a being with a structure like ours, which performs the same acts, has the same passions, the same griefs, the same pleasures, more or less intense according to the sway of the imagination and the delicacy of the nervous organization—does not such a being show clearly that it knows its faults and ours, understands good and evil, and in a word, has

consciousness of what it does? Would its soul, which feels the same joys, the same mortification and the same discomfiture which we feel, remain utterly unmoved by disgust when it saw a fellow-creature torn to bits, or when it had itself pitilessly dismembered this fellow-creature? If this be granted, it follows that the precious gift now in question would not have been denied to animals: for since they show us sure signs of repentance, as well as of intelligence, what is there absurd in thinking that beings, almost as perfect machines as ourselves, are, like us, made to understand and to feel nature?

Let no one object that animals, for the most part, are savage beasts, incapable of realizing the evil that they do; for do all men discriminate better between vice and virtue? There is ferocity in our species as well as in theirs. Men who are in the barbarous habit of breaking the natural law are not tormented as much by it, as those who transgress it for the first time, and who have not been hardened by the force of habit. The same thing is true of animals as of men—both may be more or less ferocious in temperament, and both become more so by living with others like themselves. But a gentle and peaceful animal which lives among other animals of the same disposition and of gentle nurture, will be an enemy of blood and carnage; it will blush internally at having shed blood. There is perhaps this difference, that since among animals everything is sacrificed to their needs, to their pleasures, to the necessities of life, which they enjoy more than we, their remorse apparently

should not be as keen as ours, because we are not in the same state of necessity as they. Custom perhaps dulls and perhaps stifles remorse as well as pleasures.

But I will suppose for a moment that I am utterly mistaken in concluding that almost all the world holds a wrong opinion on this subject, while I alone am right. I will grant that animals, even the best of them, do not know the difference between moral good and evil, that they have no recollection of the trouble taken for them, of the kindness done them, no realization of their own virtues. [I will suppose], for instance, that this lion, to which I, like so many others, have referred, does not remember at all that it refused to kill the man, abandoned to its fury, in a combat more inhuman than one could find among lions, tigers and bears, put together. For our compatriots fight, Swiss against Swiss, brother against brother, recognize each other, and yet capture and kill each other without remorse, because a prince pays for the murder. I suppose in short that the natural law has not been given animals. What will be the consequences of this supposition? Man is not moulded from a costlier clay; nature has used but one dough, and has merely varied the leaven. Therefore if animals do not repent for having violated this inmost feeling which I am discussing, or rather if they absolutely lack it, man must necessarily be in the same condition. Farewell then to the natural law and all the fine treatises published about it! The whole animal kingdom in general would be deprived of it. But, con-

versely, if man can not dispense with the belief that when health permits him to be himself, he always distinguishes the upright, humane, and virtuous, from those who are not humane, virtuous, nor honorable: that it is easy to tell vice from virtue, by the unique pleasure and the peculiar repugnance that seem to be their natural effects, it follows that animals, composed of the same matter, lacking perhaps only one degree of fermentation to make it exactly like man's, must share the same prerogatives of animal nature, and that thus there exists no soul or sensitive substance without remorse.[37] The following consideration will reinforce these observations.

It is impossible to destroy the natural law. The impress of it on all animals is so strong, that I have no doubt that the wildest and most savage have some moments of repentance. I believe that that cruel maid of Chalons in Champagne must have sorrowed for her crime, if she really ate her sister. I think that the same thing is true of all those who commit crimes, even involuntary or temperamental crimes; true of Gaston of Orleans who could not help stealing; of a certain woman who was subject to the same crime when pregnant, and whose children inherited it; of the woman who, in the same condition, ate her husband; of that other woman who killed her children, salted their bodies, and ate a piece of them every day, as a little relish; of that daughter of a thief and cannibal who at twelve years followed in his steps, although she had been orphaned when she was a year old, and had been brought up by honest people; to say

nothing of many other examples of which the records of our observers are full, all of them proving that there are a thousand hereditary vices and virtues which are transmitted from parents to children as those of the foster mother pass to the children she nurses. Now, I believe and admit that these wretches do not for the most part feel at the time the enormity of their actions. Bulimia, or canine hunger, for example, can stifle all feeling; it is a mania of the stomach that one is compelled to satisfy, but what remorse must be in store for those women, when they come to themselves and grow sober, and remember the crimes they have committed against those they held most dear! What a punishment for an involuntary crime which they could not resist, of which they had no consciousness whatever! However, this is apparently not enough for the judges. For of these women, of whom I tell, one was cruelly beaten and burned, and another was buried alive. I realize all that is demanded by the interest of society. But doubtless it is much to be wished that excellent physicians might be the only judges. They alone could tell the innocent criminal from the guilty. If reason is the slave of a depraved or mad desire, how can it control the desire?

But if crime carries with it its own more or less cruel punishment, if the most continued and most barbarous habit can not entirely blot out repentance in the cruelest hearts, if criminals are lacerated by the very memory of their deeds, why should we frighten the imagination of weak minds, by a hell, by specters, and by precipices

of fire even less real than those of Pascal?* Why must we have recourse to fables, as an honest pope once said himself, to torment even the unhappy wretches who are executed, because we do not think that they are sufficiently punished by their own conscience, their first executioner? I do not mean to say that all criminals are unjustly punished; I only maintain that those whose will is depraved, and whose conscience is extinguished, are punished enough by their remorse when they come to themselves, a remorse, I venture to assert, from which nature should in this case have delivered unhappy souls dragged on by a fatal necessity.

Criminals, scoundrels, ingrates, those in short without natural feelings, unhappy tyrants who are unworthy of life, in vain take a cruel pleasure in their barbarity, for there are calm moments of reflection in which the avenging conscience arises, testifies against them, and condemns them to be almost ceaselessly torn to pieces at their own hands. Whoever torments men is tormented by himself; and the sufferings that he will experience will be the just measure of those that he has inflicted.

*In a company, or at table, he always required a rampart of chairs or else some close to him at the left, to prevent his seeing horrible abysses into which (in spite of his understanding these illusions) he sometimes feared that he might fall. What a frightful result of imagination, or of the peculiar circulation in a lobe of the brain! Great man on one side of his nature, on the other he was half-mad. Madness and wisdom, each had its compartment, or its lobe, the two separated by a fissure. Which was the side by which he was so strongly attached to Messieurs of Port Royal? (I have read this in an extract from the treatise on vertigo by M. de la Mettrie.)

On the other hand, there is so much pleasure in doing good, in recognizing and appreciating what one receives, so much satisfaction in practising virtue, in being gentle, humane, kind, charitable, compassionate and generous (for this one word includes all the virtues), that I consider as sufficiently punished any one who is unfortunate enough not to have been born virtuous.

We were not originally made to be learned; we have become so perhaps by a sort of abuse of our organic faculties, and at the expense of the State which nourishes a host of sluggards whom vanity has adorned with the name of philosophers. Nature has created us all solely to be happy[38]—yes, all of us from the crawling worm to the eagle lost in the clouds. For this cause she has given all animals some share of natural law, a share greater or less according to the needs of each animal's organs when in normal condition.

Now how shall we define natural law? It is a feeling that teaches us what we should not do, because we would not wish it to be done to us. Should I dare add to this common idea, that this feeling seems to me but a kind of fear or dread, as salutary to the race as to the individual; for may it not be true that we respect the purse and life of others only to save our own possessions, our honor, and ourselves; like those Ixions of Christianity[39] who love God and embrace so many fantastic virtues, merely because they are afraid of hell!

You see that natural law is but an intimate feeling that, like all other feelings (thought in-

cluded), belongs also to imagination. Evidently, therefore, natural law does not presuppose education, revelation, nor legislator,—provided one does not propose to confuse natural law with civil laws, in the ridiculous fashion of the theologians.

The arms of fanaticism may destroy those who support these truths, but they will never destroy the truths themselves.

I do not mean to call in question the existence of a supreme being; on the contrary it seems to me that the greatest degree of probability is in favor of this belief. But since the existence of this being goes no further than that of any other toward proving the need of worship, it is a theoretic truth with very little practical value. Therefore, since we may say, after such long experience, that religion does not imply exact honesty, we are authorized by the same reasons to think that atheism does not exclude it.

Furthermore, who can be sure that the reason for man's existence is not simply the fact that he exists?[40] Perhaps he was thrown by chance on some spot on the earth's surface, nobody knows how nor why, but simply that he must live and die, like the mushrooms which appear from day to day, or like those flowers which border the ditches and cover the walls.

Let us not lose ourselves in the infinite, for we are not made to have the least idea thereof, and are absolutely unable to get back to the origin of things. Besides it does not matter for our peace of mind, whether matter be eternal or have been created, whether there be or be not a God. How

foolish to torment ourselves so much about things which we can not know, and which would not make us any happier even were we to gain knowledge about them!

But, some will say, read all such works as those of Fénelon,[41] of Nieuwentyt,[42] of Abadie,[43] of Derham,[44] of Rais,[45] and the rest. Well! what will they teach me or rather what have they taught me? They are only tiresome repetitions of zealous writers, one of them adds to the other only verbiage, more likely to strengthen than to undermine the foundations of atheism. The number of the evidences drawn from the spectacle of nature does not give these evidences any more force. Either the mere structure of a finger, of an ear, of an eye, a single observation of Malpighi[46] proves all, and doubtless much better than Descartes and Malebranche proved it, or all the other evidences prove nothing. Deists,[47] and even Christians, should therefore be content to point out that throughout the animal kingdom the same aims are pursued and accomplished by an infinite number of different mechanisms, all of them however exactly geometrical. For what stronger weapons could there be with which to overthrow atheists? It is true that if my reason does not deceive me, man and the whole universe seem to have been designed for this unity of aim. The sun, air, water, the organism, the shape of bodies,—everything is brought to a focus in the eye as in a mirror that faithfully presents to the imagination all the objects reflected in it, in accordance with the laws required by the infinite variety of bodies which take part in vision. In ears we find everywhere

a striking variety, and yet the difference of structure in men, animals, birds, and fishes, does not produce different uses. All ears are so mathematically made, that they tend equally to one and the same end, namely, hearing. But would Chance, the deist asks, be a great enough geometrician to vary thus, at pleasure, the works of which she is supposed to be the author, without being hindered by so great a diversity from gaining the same end? Again, the deist will bring forward as a difficulty those parts of the animal that are clearly contained in it for future use, the butterfly in the caterpillar, man in the sperm, a whole polyp in each of its parts, the valvule in the oval orifice, the lungs in the foetus, the teeth in their sockets, the bones in the fluid from which they detach themselves and (in an incomprehensible manner) harden. And since the partisans of this theory, far from neglecting anything that would strengthen it, never tire of piling up proof upon proof, they are willing to avail themselves of everything, even of the weakness of the mind in certain cases. Look, they say, at men like Spinoza, Vanini,[48] Desbarreau,[49] and Boindin,[50] apostles who honor deism more than they harm it. The duration of their health was the measure of their unbelief, and one rarely fails, they add, to renounce atheism when the passions, with their instrument, the body, have grown weak.

That is certainly the most that can be said in favor of the existence of God: although the last argument is frivolous in that these conversions are short, and the mind almost always regains its former opinions and acts accordingly, as soon as

it has regained or rather rediscovered its strength in that of the body. That is, at least, much more than was said by the physician Diderot,[51] in his "Pensées Philosophiques," a sublime work that will not convince a single atheist. What reply can, in truth, be made to a man who says, "We do not know nature; causes hidden in her breast might have produced everything. In your turn, observe the polyp of Trembley:[52] does it not contain in itself the causes which bring about regeneration? Why then would it be absurd to think that there are physical causes by reason of which everything has been made, and to which the whole chain of this vast universe is so necessarily bound and held that nothing which happens, could have failed to happen,[53]—causes, of which we are so invincibly ignorant that we have had recourse to a God, who, as some aver, is not so much as a logical entity? Thus to destroy chance is not to prove the existence of a supreme being, since there may be some other thing which is neither chance nor God—I mean, nature. It follows that the study of nature can make only unbelievers; and the way of thinking of all its more successful investigators proves this."

The weight of the universe therefore far from crushing a real atheist does not even shake him. All these evidences of a creator, repeated thousands and thousands of times, evidences that are placed far above the comprehension of men like us, are self-evident (however far one push the argument) only to the anti-Pyrrhonians,[54] or to those who have enough confidence in their reason to believe themselves capable of judging on the

basis of certain phenomena, against which, as you see, the atheists can urge others perhaps equally strong and absolutely opposed. For if we listen to the naturalists again, they will tell us that the very causes which, in a chemist's hands, by a chance combination, made the first mirror, in the hands of nature made the pure water, the mirror of the simple shepherdess; that the motion which keeps the world going could have created it, that each body has taken the place assigned to it by its own nature, that the air must have surrounded the earth, and that iron and the other metals are produced by internal motions of the earth, for one and the same reason; that the sun is as much a natural product as electricity; that it was not made to warm the earth and its inhabitants, whom it sometimes burns, any more than the rain was made to make the seeds grow, which it often spoils; that the mirror and the water were no more made for people to see themselves in, than were all other polished bodies with this same property; that the eye is in truth a kind of glass in which the soul can contemplate the image of objects as they are presented to it by these bodies, but that it is not proved that this organ was really made expressly for this contemplation, nor purposely placed in its socket, and in short that it may well be that Lucretius,[55] the physician Lamy,[56] and all Epicureans both ancient and modern were right when they suggested that the eye sees only because it is formed and placed as it is,[57] and that, given once for all, the same rules of motion followed by nature in the generation and develop-

ment of bodies, this marvelous organ could not have been formed and placed differently.

Such is the *pro* and the *con,* and the summary of those fine arguments that will eternally divide the philosophers. I do not take either side.

This is what I said to one of my friends, a Frenchman, as frank a Pyrrhonian as I, a man of much merit, and worthy of a better fate. He gave me a very singular answer in regard to the matter. "It is true," he told me, "that the *pro* and *con* should not disturb at all the soul of a philosopher, who sees that nothing is proved with clearness enough to force his consent, and that the arguments offered on one side are neutralized by those of the other. However," he continued, "the universe will never be happy, unless it is atheistic."[59] Here are this wretch's reasons. If atheism, said he, were generally accepted, all the forms of religion would then be destroyed and cut off at the roots. No more theological wars, no more soldiers of religion—such terrible soldiers! Nature infected with a sacred poison, would regain its rights and its purity. Deaf to all other voices, tranquil mortals would follow only the spontaneous dictates of their own being the only commands which can never be despised with impunity and which alone can lead us to happiness through the pleasant paths of virtue.

Such is natural law: whoever rigidly observes it is a good man and deserves the confidence of all the human race. Whoever fails to follow it scrupulously affects, in vain, the specious exterior

"Non notsrum inter vos tantas componere lites." [58]

of another religion; he is a scamp or a hypocrite whom I distrust.

After this, let a vain people think otherwise, let them dare affirm that even probity is at stake in not believing in revelation, in a word that another religion than that of nature is necessary, whatever it may be. Such an assertion is wretched and pitiable; and so is the good opinion which each one gives us of the religion he has embraced! We do not seek here the votes of the crowd. Whoever raises in his heart altars to superstitution, is born to worship idols and not to thrill to virtue.

But since all the faculties of the soul depend to such a degree on the proper organization of the brain and of the whole body, that apparently they are but this organization itself, the soul is clearly an enlightened machine. For finally, even if man alone had received a share of natural law, would he be any less a machine for that? A few more wheels, a few more springs than in the most perfect animals, the brain proportionally nearer the heart and for this very reason receiving more blood—any one of a number of unknown causes might always produce this delicate conscience so easily wounded, this remorse which is no more foreign to matter than to thought, and in a word all the differences that are supposed to exist here. Could the organism then suffice for everything? Once more, yes; since thought visibly develops with our organs, why should not the matter of which they are composed be susceptible of remorse also, when once it has acquired, with time, the faculty of feeling?

The soul is therefore but an empty word, of

which no one has any idea, and which an enlightened man should use only to signify the part in us that thinks.[60] Given the least principle of motion, animated bodies will have all that is necessary for moving, feeling, thinking, repenting, or in a word for conducting themselves in the physical realm, and in the moral realm which depends upon it.

Yet we take nothing for granted; those who perhaps think that all the difficulties have not yet been removed shall now read of experiments that will completely satisfy them.

1. The flesh of all animals palpitates after death. This palpitation continues longer, the more cold blooded the animal is and the less it perspires. Tortoises, lizards, serpents, etc., are evidence of this.

2. Muscles separated from the body contract when they are stimulated.

3. The intestines keep up their peristaltic or vermicular motion for a long time.

4. According to Cowper,[61] a simple injection of hot water reanimates the heart and the muscles.

5. A frog's heart moves for an hour or more after it has been removed from the body, especially when exposed to the sun or better still when placed on a hot table or chair. If this movement seems totally lost, one has only to stimulate the heart, and that hollow muscle beats again. Harvey[62] made this same observation on toads.

6. Bacon of Verulam[63] in his treatise "Sylva Sylvarum" cites the case of a man convicted of treason, who was opened alive, and whose heart thrown into hot water leaped several times, each

time less high, to the perpendicular height of two feet.

7. Take a tiny chicken still in the egg, cut out the heart and you will observe the same phenomena as before, under almost the same conditions. The warmth of the breath alone reanimates an animal about to perish in the air pump.

The same experiments, which we owe to Boyle[64] and to Stenon,[65] are made on pigeons, dogs, and rabbits. Pieces of their hearts beat as their whole hearts would. The same movements can be seen in paws that have been cut off from moles.

8. The caterpillar, the worm, the spider, the fly, the eel—all exhibit the same phenomena; and in hot water, because of the fire it contains, the movement of the detached parts increases.

9. A drunken soldier cut off with one stroke of his sabre an Indian rooster's head. The animal remained standing, then walked, and ran: happening to run against a wall, it turned around, beat its wings still running, and finally fell down. As it lay on the ground, all the muscles of this rooster kept on moving. That is what I saw myself, and almost the same phenomena can easily be observed in kittens or puppies with their heads cut off.

10. Polyps do more than move after they have been cut in pieces. In a week they regenerate to form as many animals as there are pieces. I am sorry that these facts speak against the naturalists' system of generation; or rather I am very glad of it, for let this discovery teach us never to reach a general conclusion even on the ground of all known (and most decisive) experiments.

Here we have many more facts than are needed to prove, in an incontestable way, that each tiny fibre or part of an organized body moves by a principle which belongs to it. Its activity, unlike voluntary motions, does not depend in any way on the nerves, since the movements in question occur in parts of the body which have no connection with the circulation. But if this force is manifested even in sections of fibres the heart, which is a composite of peculiarly connected fibres, must possess the same property. I did not need Bacon's story to persuade me of this. It was easy for me to come to this conclusion, both from the perfect analogy of the structure of the human heart with that of animals, and also from the very bulk of the human heart, in which this movement escapes our eyes only because it is smothered, and finally because in corpses all the organs are cold and lifeless. If executed criminals were dissected while their bodies are still warm, we should probably see in their hearts the same movements that are observed in the face-muscles of those that have been beheaded.

The motive principle of the whole body, and even of its parts cut in pieces, is such that it produces not irregular movements, as some have thought, but very regular ones, in warm blooded and perfect animals as well as in cold and imperfect ones. No resource therefore remains open to our adversaries but to deny thousands and thousands of facts which every man can easily verify.

If now any one ask me where is this innate force in our bodies, I answer that it very clearly

resides in what the ancients called the parenchyma, that is to say, in the very substance of the organs not including the veins, the arteries, the nerves, in a word, that it resides in the organization of the whole body, and that consequently each organ contains within itself forces more or less active according to the need of them.

Let us now go into some detail concerning these springs of the human machine. All the vital, animal, natural, and automatic motions are carried on by their action. Is it not in a purely mechanical way that the body shrinks back when it is struck with terror at the sight of an unforeseen precipice, that the eyelids are lowered at the menace of a blow, as some have remarked, and that the pupil contracts in broad daylight to save the retina, and dilates to see objects in darkness? Is it not by mechanical means that the pores of the skin close in winter so that the cold can not penetrate to the interior of the blood vessels, and that the stomach vomits when it is irritated by poison, by a certain quantity of opium and by all emetics, etc.? that the heart, the arteries and the muscles contract in sleep as well as in waking hours, that the lungs serve as bellows continually in exercise,——that the heart contracts more strongly than any other muscle?[66]...

I shall not go into any more detail concerning all these little subordinate forces, well known to all. But there is another more subtle and marvelous force, which animates them all; it is the source of all our feelings, of all our pleasures, of all our passions, and of all our thoughts: for the brain has its muscles for thinking, as the legs

have muscles for walking.[67] I wish to speak of this impetuous principle that Hippocrates calls *cnormon* (soul). This pprinciple exists and has its seat in the brain at the origin of the nerves, by which it exercises its control over all the rest of the body. By this fact is explained all that can be explained, even to the surprising effects of maladies of the imagination....

Look at the portrait of the famous Pope who is, to say the least, the Voltaire of the English. The effort, the energy of his genius are imprinted upon his countenance. It is convulsed. His eyes protrude from their sockets, the eyebrows are raised with the muscles of the forehead. Why? Because the brain is in travail and all the body must share in such a laborious deliverance. If there were not an internal cord which pulled the external ones, whence would come all these phenomena? To admit a soul as explanation of them, is to be reduced to [explaining phenomena by] the operations of the Holy Spirit.

In fact, if what thinks in my brain is not a part of this organ and therefore of the whole body, why does my blood boil, and the fever of my mind pass into my veins, when lying quietly in bed, I am forming the plan of some work or carrying on an abstract calculation? Put this question to men of imagination, to great poets, to men who are enraptured by the felicitous expression of sentiment, and transported by an exquisite fancy or by the charms of nature, of truth, or of virtue! By their enthusiasm, by what they will tell you they have experienced, you will judge the cause by its effects; by that harmony which Borelli,[68] a mere

anatomist, understood better than all the Leibnizians, you will comprehend the material unity of man. In short, if the nerve-tension which causes pain occasions also the fever by which the distracted mind loses its will-power, and if, conversely, the mind too much excited, disturbs the body (and kindles that inner fire which killed Bayle while he was still so young); if an agitation rouses my desire and my ardent wish for what, a moment ago, I cared nothing about, and if in their turn certain brain impressions excite the same longing and the same desires, then why should we regard as double what is manifestly one being? In vain you fall back on the power of the will, since for one order that the will gives, it bows a hundred times to the yoke.[69] And what wonder that in health the body obeys, since a torrent of blood and of animal spirits[70] forces its obedience, and since the will has as ministers an invisible legion of fluids swifter than lightning and ever ready to do its bidding! But as the power of the will is exercised by means of the nerves, it is likewise limited by them.——

Does the result of jaundice surprise you? Do you not know that the color of bodies depends on the color of the glasses through which we look at them,[71] and that whatever is the color of the humors, such is the color of objects, at least, for us, vain playthings of a thousand illusions? But remove this color from the aqueous humor of the eye, let the bile flow through its natural filter, then the soul having new eyes, will no longer see yellow. Again, is it not thus, by removing cataract, or by injecting the Eustachian canal, that

sight is restored to the blind, or hearing to the deaf? How many people, who were perhaps only clever charlatans, passed for miracle workers in the dark ages! Beautiful the soul, and powerful the will which can not act save by permission of the bodily conditions, and whose tastes change with age and fever! Should we, then, be astonished that philosophers have always had in mind the health of the body, to preserve the health of the soul, that Pythagoras[72] gave rules for the diet as carefully as Plato forbade wine?[73] The regime suited to the body is always the one with which sane physicians think they must begin, when it is a question of forming the mind, and of instructing it in the knowledge of truth and virtue; but these are vain words in the disorder of illness, and in the tumult of the senses. Without the precepts of hygiene, Epictetus, Socrates, Plato, and the rest preach in vain: all ethics is fruitless for one who lacks his share of temperance; it is the source of all virtues, as intemperance is the source of all vices.

Is more needed, (for why lose myself in discussion of the passions which are all explained by the term, *enormon,* of Hippocrates) to prove that man is but an animal, or a collection of springs which wind each other up, without our being able to tell at what point in this human circle, nature has begun? If these springs differ among themselves, these differences consist only in their position and in their degrees of strength, and never in their nature; wherefore the soul is but a principle of motion or a material and sensible part of the brain, which can be regarded, without fear or

error, as the mainspring of the whole machine, having a visible influence on all the parts. The soul seems even to have been made for the brain, so that all the other parts of the system are but a kind of emanation from the brain. This will appear from certain observations, made on different embryos, which I shall now enumerate.

This oscillation, which is natural or suited to our machine, and with which each fibre and even each fibrous element, so to speak, seems to be endowed, like that of a pendulum, can not keep up forever. It must be renewed, as it loses strength, invigorated when it is tired, and weakened when it is disturbed by excess of strength and vigor. In this alone, true medicine consists.

The body is but a watch, whose watchmaker is the new chyle. Nature's first care, when the chyle enters the blood, is to excite in it a kind of fever[74] which the chemists, who dream only of retorts, must have taken for fermentation. This fever produces a greater filtration of spirits, which mechanically animate the muscles and the heart, as if they had been sent there by order of the will.

These then are the causes or the forces of life which thus sustain for a hundred years that perpetual movement of the solids and the liquids which is as necessary to the first as to the second. But who can say whether the solids contribute more than the fluids to this movement or *vice versa?* All that we know is that the action of the former would soon cease without the help of the latter, that is, without the help of the fluids which by their onset rouse and maintain the elasticity

of the blood vessels on which their own circulation depends. From this it follows that after death the natural resilience of each substance is still more or less strong according to the remnants of life which it outlives, being the last to perish. So true is it that this force of the animal parts can be preserved and strengthened by that of the circulation, but that it does not depend on the strength of the circulation, since, as we have seen it can dispense with even the integrity of each member or organ.

I am aware that this opinion has not been relished by all scholars, and that Stahl especially had much scorn for it. This great chemist has wished to persuade us that the soul is the sole cause of all our movements. But this is to speak as a fanatic and not as a philosopher.

To destroy the hypothesis of Stahl,[75] we need not make as great an effort as I find that others have done before me. We need only glance at a violinist. What flexibility, what lightness in his fingers! The movements are so quick, that it seems almost as if there were no succession. But I pray, or rather I challenge, the followers of Stahl who understand so perfectly all that our soul can do, to tell me how it could possibly execute so many motions so quickly, motions, moreover, which take place so far from the soul, and in so many different places. That is to suppose that a flute player could play brilliant cadences on an infinite number of holes that he could not know, and on which he could not even put his finger!

But let us say with M. Hecquet[76] that all men

may not go to Corinth.[77] Why should not Stahl have been even more favored by nature as a man than as a chemist and a practitioner? Happy mortal, he must have received a soul different from that of the rest of mankind,—a sovereign soul, which, not content with having some control over the voluntary muscles, easily held the reins of all the movements of the body, and could suspend them, calm them, or excite them, at its pleasure! With so despotic a mistress, in whose hands were, in a sense, the beating of the heart, and the laws of circulation, there could certainly be no fever, no pain, no weariness....! The soul wills, and the springs play, contract or relax. But how did the springs of Stahl's machine get out of order so soon? He who has in himself so great a doctor, should be immortal.

Moreover, Stahl is not the only one who has rejected the principle of the vibration of organic bodies. Greater minds have not used the principle when they wished to explain the action of the heart....etc. One need only read the "Institutions of Medicine" by Boerhaave[78] to see what laborious and enticing systems this great man was obliged to invent, by the labor of his mighty genius, through failure to admit that there is so wonderful a force in all bodies.

Willis[79] and Perrault,[80] minds of a more feeble stamp, but careful observers of nature (whereas nature was known to the famous Leyden professor only through others and second hand, so to speak) seem to have preferred to suppose a soul generally extended over the whole body, instead of the principle which we are describing. But

according to this hypothesis (which was the hypothesis of Vergil and of all Epicureans, an hypothesis which the history of the polyp might seem at first sight to favor) the movements which go on after the death of the subject in which they inhere are due to a remnant of soul still maintained by the parts that contract, though, from the moment of death, these are not excited by the blood and the spirits. Whence it may be seen that these writers, whose solid works easily eclipse all philosophic fables, are deceived only in the manner of those who have endowed matter with the faculty of thinking, I mean to say, by having expressed themselves badly in obscure and meaningless terms. In truth, what is this remnant of a soul, if it is not the "moving force" of the Leibnizians (badly rendered by such an expression), which however Perrault in particular has really foreseen. See his "Treatise on the Mechanism of Animals."

Now that it is clearly proved against the Cartesians, the followers of Stahl, the Malebranchists, and the theologians who little deserve to be mentioned here, that matter is self-moved,[81] not only when organized, as in a whole heart, for example, but even when this organization has been destroyed, human curiosity would like to discover how a body, by the fact that it is originally endowed with the breath of life, finds itself adorned in consequence with the faculty of feeling, and thus with that of thought. And, heavens, what efforts have not been made by certain philosophers to manage to prove this! and what nonsense on this subject I have had the patience to read!

All that experience teaches us is that while movement persists, however slight it may be, in one or more fibres, we need only stimulate them to re-excite and animate this movement almost extinguished. This has been shown in the host of experiments with which I have undertaken to crush the systems. It is therefore certain that motion and feeling excite each other in turn, both in a whole body and in the same body when its structure is destroyed, to say nothing of certain plants which seem to exhibit the same phenomena of the union of feeling and motion.

But furthermore, how many excellent philosophers have shown that thought is but a faculty of feeling, and that the reasonable soul is but the feeling soul engaged in contemplating its ideas and in reasoning! This would be proved by the fact alone that when feeling is stifled, thought also is checked, for instance in apoplexy, in lethargy, in catalepsis, etc. For it is ridiculous to suggest that, during these stupors, the soul keeps on thinking even though it does not remember the ideas that it has had.

As to the development of feeling and motion, it is absurd to waste time seeking for its mechanism. The nature of motion is as unknown to us as that of matter.[82] How can we discover how it is produced unless, like the author of "The History of the Soul," we resuscitate the old and unintelligible doctrine of substantial forms? I am then quite as content not to know how inert and simple matter becomes active and highly organized, as not to be able to look at the sun without red glasses; and I am as little disquieted concern-

ing the other incomprehensible wonders of nature, the production of feeling and of thought in a being which earlier appeared to our limited eyes as a mere clod of clay.

Grant only that organized matter is endowed with a principle of motion, which alone differentiates it from the inorganic (and can one deny this in the face of the most incontestable observation?) and that among animals, as I have sufficiently proved, everything depends upon the diversity of this organization: these admissions suffice for guessing the riddle of substances and of man. It [thus] appears that there is but one [type of organization] in the universe, and that man is the most perfect [example]. He is to the ape, and to the most intelligent animals, as the planetary pendulum of Huyghens[83] is to a watch of Julien Leroy.[84] More instruments, more wheels and more springs were necessary to mark the movements of the planets than to mark or strike the hours; and Vaucanson,[85] who needed more skill for making his flute player than for making his duck, would have needed still more to make a talking man, a mechanism no longer to be regarded as impossible, especially in the hands of another Prometheus. In like fashion, it was necessary that nature should use more elaborate art in making and sustaining a machine which for a whole century could mark all motions of the heart and of the mind; for though one does not tell time by the pulse, it is at least the barometer of the warmth and the vivacity by which one may estimate the nature of the soul. I am right! The human body is a watch, a large watch constructed

with such skill and ingenuity, that if the wheel which marks the seconds happens to stop, the minute wheel turns and keeps on going its round, and in the same way the quarter-hour wheel, and all the others go on running when the first wheels have stopped because rusty or, for any reason, out of order. Is it not for a similar reason that the stoppage of a few blood vessels is not enough to destroy or suspend the strength of the movement which is in the heart as in the mainspring of the machine; since, on the contrary, the fluids whose volume is diminished, having a shorter road to travel, cover the ground more quickly, borne on as by a fresh current which the energy of the heart increases in proportion to the resistance it encounters at the ends of the blood-vessels? And is not this the reason why the loss of sight (caused by the compression of the optic nerve and by its ceasing to convey the images of objects) no more hinders hearing, than the loss of hearing (caused by obstruction of the functions of the auditory nerve) implies the loss of sight? In the same way, finally, does not one man hear (except immediately after his attack) without being able to say that he hears, while another who hears nothing, but whose lingual nerves are uninjured in the brain, mechanically tells of all the dreams which pass through his mind? These phenomena do not surprise enlightened physicians at all. They know what to think about man's nature, and (more accurately to express myself in passing) of two physicians, the better one and the one who deserves more confidence is always, in my opinion, the one who is more versed in the

physique or mechanism of the human body, and who, leaving aside the soul and all the anxieties which this chimera gives to fools and to ignorant men, is seriously occupied only in pure naturalism.

Therefore let the pretended M. Charp deride philosophers who have regarded animals as machines. How different is my view! I believe that Descartes would be a man in every way worthy of respect, if, born in a century that he had not been obliged to enlighten, he had known the value of experiment and observation, and the danger of cutting loose from them. But it is none the less just for me to make an authentic reparation to this great man for all the insignificant philosophers—poor jesters, and poor imitators of Locke—who instead of laughing impudently at Descartes, might better realize that without him the field of philosophy, like the field of science without Newton, might perhaps be still uncultivated.

This celebrated philosopher, it is true, was much deceived, and no one denies that. But at any rate he understood animal nature, he was the first to prove completely that animals are pure machines.[86] And after a discovery of this importance demanding so much sagacity, how can we without ingratitude fail to pardon all his errors!

In my eyes, they are all atoned for by that great confession. For after all, although he extols the distinctness of the two substances, this is plainly but a trick of skill, a ruse of style, to make theologians swallow a poison, hidden in the shade of

an analogy which strikes everybody else and which they alone fail to notice. For it is this, this strong analogy, which forces all scholars and wise judges to confess that these proud and vain beings, more distinguished by their pride than by the name of men however much they may wish to exalt themselves, are at bottom only animals and machines which, though upright, go on all fours. They all have this marvelous instinct, which is developed by education into mind, and which always has its seat in the brain, (or for want of that when it is lacking or hardened, in the medulla oblongata) and never in the cerebellum; for I have often seen the cerebellum injured, and other observers* have found it hardened, when the soul has not ceased to fulfil its functions.

To be a machine, to feel, to think, to know how to distinguish good from bad, as well as blue from yellow, in a word, to be born with an intelligence and a sure moral instinct, and to be but an animal, are therefore characters which are no more contradictory, than to be an ape or a parrot and to be able to give oneself pleasure..... I believe that thought is so little incompatible with organized matter, that it seems to be one of its properties on a par with electricity, the faculty of motion, impenetrability, extension, etc.

Do you ask for further observations? Here are some which are incontestable and which all prove that man resembles animals perfectly, in his origin as well as in all the points in which we have thought it essential to make the comparison....

*Haller in the *Transact. Philosoph.*

Let us observe man both in and out of his shell, let us examine young embryos of four, six, eight or fifteen days with a microscope; after that time our eyes are sufficient. What do we see? The head alone; a little round egg with two black points which mark the eyes. Before that, everything is formless, and one sees only a medullary pulp, which is the brain, in which are formed first the roots of the nerves, that is, the principle of feeling, and the heart, which already within this substance has the power of beating of itself; it is the *punctum saliens* of Malpighi, which perhaps already owes a part of its excitability to the influence of the nerves. Then little by little, one sees the head lengthen from the neck, which, in dilating, forms first the thorax inside which the heart has already sunk, there to become stationary; below that is the abdomen, which is divided by a partition (the diaphragm). One of these enlargements of the body forms the arms, the hands, the fingers, the nails, and the hair; the other forms the thighs, the legs, the feet, etc., which differ only in their observed situation, and which constitute the support and the balancing pole of the body. The whole process is a strange sort of growth, like that of plants. On the tops of our heads is hair in place of which the plants have leaves and flowers; everywhere is shown the same luxury of nature, and finally the directing principle of plants is placed where we have our soul, that other quintessence of man.

Such is the uniformity of nature, which we are beginning to realize; and the analogy of the animal with the vegetable kingdom, of man with

plant. Perhaps there even are animal plants, which in vegetating, either fight as polyps do, or perform other functions characteristic of animals.....

We are veritable moles in the field of nature; we achieve little more than the mole's journey and it is our pride which prescribes limits to the limitless. We are in the position of a watch that should say (a writer of fables would make the watch a hero in a silly tale): "I was never made by that fool of a workman, I who divide time, who mark so exactly the course of the sun, who repeat alond the hours which I mark! No! that is impossible!" In the same way, we disdain, ungrateful wretches that we are, this common mother of all kingdoms, as the chemists say. We imagine, or rather we infer, a cause superior to that to which we owe all, and which truly has wrought all things in an inconceivable fashion. No; matter contains nothing base, except to the vulgar eyes which do not recognize her in her most splendid works; and nature is no stupid workman. She creates millions of men, with a facility and a pleasure more intense than the effort of a watchmaker in making the most complicated watch. Her power shines forth equally in creating the lowliest insect and in creating the most highly developed man; the animal kingdom costs her no more than the vegetable, and the most splendid genius no more than a blade of wheat. Let us then judge by what we see of that which is hidden from the curiosity of our eyes and of our investigations, and let us not imagine anything beyond. Let us observe the ape, the

beaver, the elephant, etc., in their operations. If it is clear that these activities can not be performed without intelligence, why refuse intelligence to these animals? And if you grant them a soul, you are lost, you fanatics! You will in vain say that you assert nothing about the nature of the animal soul and that you deny its immortality. Who does not see that this is a gratuitous assertion; who does not see that the soul of an animal must be either mortal or immortal, whichever ours [is], and that it must therefore undergo the same fate as ours, whatever that may be, and that thus [in admitting that animals have souls], you fall into Scylla in the effort to avoid Charybdis?

Break the chain of your prejudices, arm yourselves with the torch of experience, and you will render to nature the honor she deserves, instead of inferring anything to her disadvantage, from the ignorance in which she has left you. Only open wide your eyes, only disregard what you can not understand, and you will see that the ploughman whose intelligence and ideas extend no further than the bounds of his furrow, does not differ essentially from the greatest genius,—a truth which the dissection of Descartes's and of Newton's brains would have proved; you will be persuaded that the imbecile and the fool are animals with human faces, as the intelligent ape is a little man in another shape; in short, you will learn that since everything depends absolutely on difference of organization, a well constructed animal which has studied astronomy, can predict an eclipse, as it can predict recovery or death when

it has used its genius and its clearness of vision, for a time, in the school of Hippocrates and at the bedside of the sick. By this line of observations and truths, we come to connect the admirable power of thought with matter, without being able to see the links, because the subject of this attribute is essentially unknown to us.

Let us not say that every machine or every animal perishes altogether or assumes another form after death, for we know absolutely nothing about the subject. On the other hand, to assert that an immortal machine is a chimera or a logical fiction, is to reason as absurdly as caterpillars would reason if, seeing the cast-off skins of their fellow-caterpillars, they should bitterly deplore the fate of their species, which to them would seem to come to nothing. The soul of these insects (for each animal has his own) is too limited to comprehend the metamorphoses of nature. Never one of the most skilful among them could have imagined that it was destined to become a butterfly. It is the same with us. What more do we know of our destiny than of our origin? Let us then submit to an invincible ignorance on which our happiness depends.

He who so thinks will be wise, just, tranquil about his fate, and therefore happy. He will await death without either fear or desire, and will cherish life (hardly understanding how disgust can corrupt a heart in this place of many delights) ; he will be filled with reverence, gratitude, affection, and tenderness for nature, in proportion to his feeling of the benefits he has received from nature; he will he happy, in short,

in feeling nature, and in being present at the enchanting spectacle of the universe, and he will surely never destroy nature either in himself or in others. More than that! Full of humanity, this man will love human character even in his enemies. Judge how he will treat others. He will pity the wicked without hating them; in his eyes, they will be but mis-made men. But in pardoning the faults of the structure of mind and body, he will none the less admire the beauties and the virtues of both. Those whom nature shall have favored will seem to him to deserve more respect than those whom she has treated in stepmotherly fashion. Thus, as we have seen, natural gifts, the source of all acquirements, gain from the lips and heart of the materialist, the homage which every other thinker unjustly refuses them. In short, the materialist, convinced, in spite of the protests of his vanity, that he is but a machine or an animal, will not maltreat his kind, for he will know too well the nature of those actions, whose humanity is always in proportion to the degree of the analogy proved above [between human beings and animals]; and following the natural law given to all animals, he will not wish to do to others what he would not wish them to do to him.

Let us then conclude boldly that man is a machine, and that in the whole universe there is but a single substance differently modified. This is no hypothesis set forth by dint of a number of postulates and assumptions; it is not the work of prejudice, nor even of my reason alone; I should have disdained a guide which I think to be so un-

trustworthy, had not my senses, bearing a torch, so to speak, induced me to follow reason by lighting the way themselves. Experience has thus spoken to me in behalf of reason; and in this way I have combined the two.

But it must have been noticed that I have not allowed myself even the most vigorous and immediately deduced reasoning, except as a result of a multitude of observations which no scholar will contest; and furthermore, I recognize only scholars as judges of the conclusions which I draw from the observations; and I hereby challenge every prejudiced man who is neither anatomist, nor acquainted with the only philosophy which can here be considered, that of the human body. Against so strong and solid an oak, what could the weak reeds of theology, of metaphysics, and of the schools, avail,—childish arms, like our parlor foils, that may well afford the pleasure of fencing, but can never wound an adversary. Need I say that I refer to the empty and trivial notions, to the pitiable and trite arguments that will be urged (as long as the shadow of prejudice or of superstitution remains on earth) for the supposed incompatibility of two substances which meet and move each other unceasingly? Such is my system, or rather the truth, unless I am much deceived. It is short and simple. Dispute it now who will.

THE NATURAL HISTORY OF THE SOUL.

BY JEAN OFFRAY DE LA METTRIE.

EXTRACTS.

THE NATURAL HISTORY OF THE SOUL.

CHAPTER II. CONCERNING MATTER.

ALL philosophers who have examined attentively the nature of matter, considered in itself, independently of all the forms which constitute bodies, have discovered in this substance, diverse properties proceeding from an absolutely unknown essence. Such are, (1) the capacity of taking on different forms, which are produced in matter itself, by which matter can acquire moving force and the faculty of feeling; (2) actual extension, which these philosophers have rightly recognized as an attribute, but not as the essence, of matter.

However, there have been some, among others Descartes, who have insisted on reducing the essence of matter to simple extension, and on limiting all the properties of matter to those of extension; but this opinion has been rejected by all other modern philosophers,. . . . so that the power of acquiring moving force, and the faculty of feeling as well as that of extension, have been from all time considered as essential properties[87] of matter.

All the diverse properties that are observed in this unknown principle demonstrate a being in

which these same properties exist, a being which must therefore exist through itself. But we can not conceive, or rather it seems impossible, that a being which exists through itself should be able neither to create nor to annihilate itself. It is evident that only the forms to which its essential properties make it susceptible can be destroyed and reproduced in turn. Thus, does experience force us to confess that nothing can come from nothing.

All philosophers who have not known the light of faith, have thought that this substantial principle of bodies has existed and will exist forever, and that the elements of matter have an indestructible solidity which forbids the fear that the world is going to fall to pieces. The majority of Christian philosophers also recognize that the substantial principle of bodies exists necessarily through itself, and that the power of beginning or ending does not accord with its nature. One finds that this view is upheld by an author of the last century who taught theology in Paris.

CHAPTER III. CONCERNING THE EXTENSION OF MATTER.

Although we have no idea of the essence of matter, we can not refuse to admit the existence of the properties which our senses discover in it.

I open my eyes, and I see around me only matter, or the extended. Extension is then a property which always belongs to all matter, which can belong to matter alone, and which therefore is inseparable from the substance of matter.

This property presupposes three dimensions in

the substance of bodies, length, width, and depth. Truly, if we consult our knowledge, which is gained entirely from the senses, we cannot conceive of matter, or the substance of bodies, without having the idea of a being which is at the same time long, broad, and deep; because the idea of these three dimensions is necessarily bound up with our idea of every magnitude or quantity.

Those philosophers who have meditated most concerning matter do not understand by the extension of this substance, a solid extension composed of distinct parts, capable of resistance. Nothing is united, nothing is divided in this extension; for there must be a force which separates to divide, and another force to unite the divided parts. But in the opinion of these physical philosophers matter has no actually active force, because every force can come only from movement, or from some impulse or tendency toward movement, and they recognize in matter, stripped of all form by abstraction, only a potential moving force.

This theory is hard to conceive, but given its principles, it is vigorously true in its consequences. It is one of those algebraic truths which is more readily believed than conceived by the mind.

The extension of matter is then but a metaphysical extension, which according to the idea of these very philosophers, presents nothing to affect our senses. They rightly think that only solid extension can make an impression on our senses. It thus seems to us that extension is an

attribute which constitutes part of the metaphysical form, but we are far from thinking that extension constitutes its essence.

However, before Descartes, some of the ancients made the essence of matter consist in solid extension. But this opinion, of which all the Cartesians have made much, has at all times been victoriously combated by clear reasons, which we will set forth later, for order demands that we first examine to what the properties of extension can be reduced.

CHAPTER V. CONCERNING THE MOVING FORCE OF MATTER.

The ancients, persuaded that there is no body without a moving force, regarded the substance of bodies as composed of two primitive attributes. It was held that, through one of these attributes, this substance has the capacity for moving and, through the other, the capacity for being moved.[88] As a matter of fact, it is impossible not to conceive these two attributes in every moving body, namely, the thing which moves, and the same thing which is moved.

It has just been said that formerly the name, matter, was given to the substance of bodies, in so far as it is susceptible of being moved. When capable of moving this same matter was known by the name of "active principle"... But these two attributes seem to depend so essentially on each other that Cicero, in order better to state this esential and primitive union of matter with its moving principle, says that each is found in the

other. This expresses very well the idea of the ancients.

From this it is clear that modern writers have given us but an inexact idea of matter in attempting (through a confusion ill understood) to give this name to the substance of bodies. For, once more, matter, or the passive principle of the substance of bodies, constitutes only one part of this substance. Thus it is not surprising that these modern thinkers have not discovered in matter moving force and the faculty of feeling.

It should now be evident at the first glance, it seems to me, that if there is an active principle it must have, in the unknown essence of matter, another source than extension. This proves that simple extension fails to give an adequate idea of the complete essence or metaphysical form of the substance of bodies, and that this failure is due solely to the fact that extension excludes the idea of any activity in matter. Therefore, if we demonstrate this moving principle, if we show that matter, far from being as indifferent as it is supposed to be, to movement and to rest, ought to be regarded as an active, as well as a passive substance, what resource can be left to those who have made its essence consist in extension?

The two principles of which we have just spoken, extension and moving force, are then but potentialities of the substance of bodies; for in the same way in which this substance is susceptible of movement, without actually being moved, it also has always, even when it is not moving itself, the faculty of spontaneous motion.

The ancients have rightly noticed that this

moving force acts in the substance of bodies only when the substance is manifested in certain forms; they have also observed that the different motions which it produces are all subject to these different forms or regulated by them. That is why the forms, through which the substance of bodies can not only move, but also move in different ways, were called material forms.

Once these early masters had cast their eyes on all the phenomena of nature, they discovered in the substance of bodies, the power of self-movement. In fact, this substance either moves itself, or when it is in motion, the motion is communicated to it by another substance. But can anything be seen in this substance, save the substance itself in action; and if sometimes it seems to receive a motion that it has not, does it receive that motion from any cause other than this same kind of substance, whose parts act the one upon the other?

If, then, one infers another agent, I ask what agent, and I demand proofs of its existence. But since no one has the least idea of such an agent, it is not even a logical entity. Therefore it is clear that the ancients must have easily recognized an intrinsic force of motion within the substance of bodies, since in fact it is impossible to prove or conceive any other substance acting upon it.

Descartes, a genius made to blaze new paths and to go astray in them, supposed with some other philosophers that God is the only efficient cause of motion, and that every instant He communicates motion to all bodies. But this opinion

is but an hypothesis which he tried to adjust to the light of faith; and in so doing he was no longer attempting to speak as a philosopher or to philosophers. Above all he was not addressing those who can be convinced only by the force of evidence.

The Christian Scholastics of the last centuries have felt the full force of this reflection; for this reason they have wisely limited themselves to purely philosophic knowledge concerning the motion of matter, although they might have shown that God Himself said that He had "imprinted an active principle in the elements of matter (Gen. i; Is. lxvi)."

One might here make up a long list of authorities, and take from the most celebrated professors the substance of the doctrine of all the rest; but it is clear enough, without a medley of citations, that matter contains this moving force which animates it, and which is the immediate cause of all the laws of motion.

CHAPTER VI. CONCERNING THE SENSITIVE FACULTY OF MATTER.

We have spoken of two essential attributes of matter, upon which depend the greater number of its properties, namely extension and moving force. We have now but to prove a third attribute: I mean the faculty of feeling which the philosophers of all centuries have found in this same substance. I say all philosophers, although I am not ignorant of all the efforts which the Cartesians have made, in vain, to rob matter of this faculty. But in order to avoid insurmountable

difficulties, they have flung themselves into a labyrinth from which they have thought to escape by this absurd system "that animals are pure machines."[89]

An opinion so absurd has never gained admittance among philosophers, except as the play of wit or as a philosophical pastime. For this reason we shall not stop to refute it. Experience gives us no less proof of the faculty of feeling in animals than of feeling in men.....

There comes up another difficulty which more nearly concerns our vanity: namely, the impossibility of our conceiving this property as a dependence or attribute of matter. Let it not be forgotten that this substance reveals to us only ineffable characters. Do we understand better how extension is derived from its essence, how it can be moved by a primitive force whose action is exerted without contact, and a thousand other miracles so hidden from the gaze of the most penetrating eyes, that (to paraphrase the idea of an illustrious modern writer) they reveal only the curtain which conceals them?

But might not one suppose as some have supposed, that the feeling which is observed in animated bodies, might belong to a being distinct from the matter of these bodies, to a substance of a different nature united to them? Does the light of reason allow us in good faith to admit such conjectures? We know in bodies only matter, and we observe the faculty of feeling only in bodies: on what foundation then can we erect an ideal being, disowned by all our knowledge?

However, we must admit, with the same frank-

ness, that we are ignorant whether matter has in itself the faculty of feeling, or only the power of acquiring it by those modifications or forms to which matter is susceptible; for it is true that this faculty of feeling appears only in organic bodies.

This is then another new faculty which might exist only potentially in matter, like all the others which have been mentioned; and this was the hypothesis of the ancients, whose philosophy, full of insight and penetration, deserves to be raised above the ruins of the philosophy of the moderns. It is in vain that the latter disdain the sources too remote from them. Ancient philosophy will always hold its own among those who are worthy to judge it, because it forms (at least in relation to the subject of which I am treating) a system that is solid and well articulated like the body, whereas all these scattered members of modern philosophy form no system.

APPENDIX.

OUTLINES AND NOTES.

BY GERTRUDE CARMAN BUSSEY.

LA METTRIE'S RELATION TO HIS PREDECESSORS AND TO HIS SUCCESSORS.

I. *The Historical Relation of La Mettrie to Réné Descartes* (1596-1650).

The most direct source of La Mettrie's work, if the physiological aspect of his system is set aside, is found in the philosophy of Descartes. In fact it sometimes seems as if La Mettrie's materialism grew out of his insistence on the contradictory character of the dualistic system of Descartes. He criticises Descartes's statement that the body and soul are absolutely independent, and takes great pains to show the dependence of the soul on the body. Yet though La Mettrie's system may be opposed to that of Descartes[1] from one point of view, from another point of view it seems to be a direct consequence of it. La Mettrie himself recognizes this relationship and feels that his doctrine that man is a machine, is a natural inference from Descartes's teaching that animals are mere machines.[2] Moreover La Mettrie carries on Descartes's conception of the body as a machine, and many of his detailed discussions of the machinery of the body seem to have been drawn from Descartes.

[1] "L'histoire naturelle de l'âme," chapters XI, VIII.

[2] "Man a Machine," p. 142. Cf. La Mettrie's commentary on Descartes's teaching in "Abrégé des systèmes philosophiques," *Œuvres*, Tome 2.

It should be noted that La Mettrie did justice to Descartes, and realized how much all philosophers owed to him. He insisted moreover that Descartes's errors were due to his failure to follow his own method.[3] Yet La Mettrie's method was different from that of Descartes, for La Mettrie was an empiricist[4] without rationalistic leaning. As regards doctrine: La Mettrie differed from Descartes in his opinion of matter. Since he disbelieved in any spiritual reality, he gave matter the attributes of motion and thought, while Descartes insisted that the one attribute of matter is extension.[5] It was a natural consequence of La Mettrie's disbelief in spiritual substance that he could throw doubt on the existence of God.[6] On the other hand the belief in God was one of the foundations of Descartes's system. La Mettrie tried to show that Descartes's belief in a soul and in God was merely designed to hide his true thought from the priests, and to save himself from persecution.[7]

IIa. *The Likeness of La Mettrie to the English Materialists, Thomas Hobbes* (1588-1679) and *John Toland* (1670-1721).

The influence of Descartes upon La Mettrie cannot be questioned, but it is more difficult to esti-

[3] "Abrégé des systèmes, Descartes," p. 6, *Œuvres Philosophiques*, Tome 2.

[4] "Man a Machine," page 89. Cf. "L'histoire naturelle de l'âme" (or "Traité de l'ame"), *Œuvres*, 1746, p. 229.

[5] Descartes, "Principles," Part II, Prop. 4.

[6] "Man a Machine," pp. 122-126.

[7] *Ibid.*, p. 142.

mate the influence upon him of materialistic philosophers. Hobbes published "The Leviathan" in 1651 and "De Corpore" in 1655. Thus he wrote about a century before La Mettrie, and since the eighteenth century was one in which the influence of England upon France was very great, it is easy to suppose that La Mettrie had read Hobbes. If so, he must have gained many ideas from him. The extent of this influence is, however, unknown, for La Mettrie rarely if ever quotes from Hobbes, or attributes any of his doctrines to Hobbes.

In the first place, both Hobbes and La Mettrie are thoroughgoing materialists. They both believe that body is the only reality, and that anything spiritual is unimaginable.[8] Furthermore, their conceptions of matter are very similar. According to La Mettrie, matter contains the faculty of sensation and the power of motion as well as the quality of extension.[9] This same conception of matter is held by Hobbes, for he specifically attributes extension and motion to matter, and then reduces sensation to a kind of internal motion.[10] Thus sensation also may be an attribute of matter. Moreover Hobbes and La Mettrie are in agreement on many smaller points, and La Mettrie elaborates much that is suggested in Hobbes. They both believe that the passions are dependent on bodily conditions.[11] They agree in

[8] Hobbes, "Leviathan," Part III, Chap. 34; Part I, Chap. XII, Open Court Edition, p. 169.

[9] "L'histoire naturelle de l'âme," Chapters III, V, and VI.

[10] "Leviathan," Part I, Chap. I. Cf. "Concerning Body," Part IV, Chap. XXV, 2.

[11] "Man a Machine," pp. 90-91.

the belief that all the differences in men are due to differences in the constitution and organization of their bodies.[12] They both discuss the nature and importance of language.[13]

Hobbes differs from La Mettrie in holding that we can be sure that God exists as the cause of this world.[14] However even though he thinks that it is possible to know that God exists, he does not believe that we can know his nature.

La Mettrie's system may be regarded as the application of a system like that of Hobbes to the special problem of the relation of soul and body in man; for if there is nothing in the universe but matter and motion, it inevitably follows that man is merely a very complicated machine.

There is great similarity also between the doctrine of La Mettrie and that of Toland. It is interesting to note the points of resemblance and of difference. Toland's "Letters to Serena," which contain much of his philosophical teaching, were published in 1704. There is a possibility therefore that La Mettrie read them and gained some suggestions from them.

The point most emphasized in Toland's teaching[15] is that motion is an attribute of matter. He argues for this belief on the ground that matter must be essentially active in order to undergo change,[16] and that the conception of the inertness of matter is based on the conception of absolute

[12] "Leviathan," Part I, Chap. VI, Molesworth Ed., p. 40. Cf. "Man a Machine," p. 90.

[13] *Ibid.*, Part I, Chap. IV. Cf. "Man a Machine," p. 103.

[14] *Ibid.*, Part I, Chap. XII.

[15] "Letters to Serena," V, p. 168.

[16] *Ibid.*, p. 196.

rest, and that this absolute rest is nowhere to be found.[17] Since motion is essential to matter, there is no need, Toland believes, to account for the beginning of motion. Those who have regarded matter as inert have had to find some efficient cause for motion, and to do this, they have held that all nature is animated. But this pretended animation is utterly useless, since matter is itself endowed with motion.[18] The likeness to La Mettrie is evident. La Mettrie likewise opposes the doctrine of the animation of matter, and the belief in any external cause of motion.[19] Yet he feels the need of postulating some beginning of motion,[20] and although he uses the conception so freely, he does not agree with Toland that the nature of motion is known. He believes that it is impossible to know the nature of motion,[21] while Toland believes that the nature of motion is self-evident.[22]

Another point of contrast between Toland and La Mettrie is in their doctrines of God. Toland believes that God, "a pure spirit or immaterial being," is necessary for his system,[23] while La Mettrie questions God's existence and insists that immateriality and spirituality are fine words that no one understands.

It must be admitted in truth, that La Mettrie and Toland have different interests and different

[17] *Ibid.*, p. 203.
[18] *Ibid.*, p. 199.
[19] "L'histoire naturelle de l'âme," Chap. V, p. 94.
[20] "Man a Machine," p. 139.
[21] "Man a Machine, p. 140.
[22] "Letters to Serena," V, p. 227.
[23] *Ibid.*, V, p. 234.

points of view. Toland is concerned to discover the essential nature of matter, while La Mettrie's problem is to find the specific relation of body and mind. On this relation, he builds his whole system.

b. The Relation of La Mettrie to an English Sensationalist: John Locke (1632-1704).

Locke's "Essay Concerning Human Understanding" was published in 1690, and La Mettrie, like most cultured Frenchmen of the Enlightenment, was influenced by his teaching. The main agreement between Locke and La Mettrie is in their doctrine that all ideas are derived from sensation. Both vigorously oppose the belief in innate ideas,[24] teaching that even our most complex and our most abstract ideas are gained through sensation. But La Mettrie does not follow Locke in analyzing these ideas and in concluding that many sensible qualities of objects—such as colors, sounds, etc.—have no existence outside the mind.[25] He rejects Locke's doctrine of spiritual substances,[26] and opposes Locke's theistic teaching, laying stress, on the other hand, upon Locke's admission of the possibility that "thinking being may also be material."[27]

[24] John Locke, "Essay Concerning Human Understanding," Book I, Book II, Chap. I.

[25] Locke, "Essay," Book II, Chap. 8.

[26] *Ibid.*, Book II, Chap. 23.

[27] *Ibid.*, Book IV, Chap. 10. For La Mettrie's summary of Locke, cf. his "Abrégé des systèmes," *Œuvres*, Tome 2.

III*a*. *The Likeness, probable but unacknowledged, to La Mettrie, of the French Sensationalists, Etienne Bonnot de Condillac* (1715-1780) and *Claude Adrien Helvetius* (1715-1771).

Condillac's "Traité des sensations" was published about ten years after La Mettrie's "L'histoire naturelle de l'ame," and therefore it is probable that Condillac had read this work, and gained some ideas from it. Yet Condillac never mentions La Mettrie's name nor cites his doctrines. This omission may be accounted for by the fact that the works of La Mettrie had been so condemned that later philosophers wished to conceal the similarity of their doctrines to his. Whether the sensationalists were influenced by his teachings or not, there is such a profound likeness in their teachings, that La Mettrie may well be regarded as one of the first French sensationalists as well as one of the leading French materialists of the time.

Condillac and La Mettrie agree that experience is the source of all knowledge. As Lange suggests,[28] La Mettrie's development of reason from the imagination may have suggested to Condillac the way to develop all the faculties from the soul. La Mettrie asserts that reason is but the sensitive soul contemplating its ideas, and that imagination plays all the rôles of the soul, while Condillac elaborates the same idea, and shows in great detail how all the faculties of the soul are but modifications of sensation.[29]

[28] F. A. Lange, "History of Materialism," Vol. II, Chap. II.

[29] "Traité des sensations," Part I.

Both La Mettrie and Condillac believe that there is no gulf between man and the lower animals; but this leads to a point of disagreement between the two philosophers, for Condillac absolutely denies that animals can be mere machines,[30] and we must suppose that he would the more ardently oppose the teaching that man is merely a complicated machine! Condillac finally, unlike La Mettrie, believes in the existence of God. A final point of contrast also concerns the theology of the two writers. La Mettrie insists that we can not be sure that there is any purpose in the world, while Condillac affirms that we can discern intelligence and design throughout the universe.[31]

Like La Mettrie and Condillac, Helvetius teaches that all the faculties of the mind can be reduced to sensation.[32] Unlike La Mettrie, he specifically distinguishes the mind from the soul, and describes the mind as a later developed product of the soul or faculty of sensation.[33] This idea may have been suggested by La Mettrie's statement that reason is a modification of sensation. Helvetius, however, unlike La Mettrie, does not clearly decide that sensation is but a result of bodily conditions, and he admits that sensation may be a modification of a spiritual substance.[34] Moreover, he claims that climate and food have no effect on the mind, and that the superiority of the under-

[30] "Traité des animaux," Chap. I, p. 454.

[31] "Traité des animaux," Chap. VI, p. 577 ff.

[32] "Treatise on Man," Sect. II. Chap. I, p. 96.

[33] *Ibid.*, Sect. II, Chap. II, p. 108.

[34] "Essays on the Mind," Essay II, Chap. I, p. 35.

standing is not dependent on the strength of the body and its organs.[35]

La Mettrie and Helvetius resemble each other in ethical doctrine. Both make pleasure and pain the ruling motives of man's conduct. They claim that all the emotions are merely modifications of corporeal pleasure and pain, and that therefore the only principle of action in man is the desire for pleasure and the fear of pain.[36]

b. The Likeness to La Mettrie of the French Materialist, Baron Paul Heinrich Dietrich von Holbach (1723-1789).

As Condillac and Helvetius emphasize the sensationalism taught by La Mettrie, so Holbach's book is a reiteration and elaboration of the materialism set forth in La Mettrie's works. The teaching of Holbach is so like that of La Mettrie, that the similarity can hardly be a coincidence.

La Mettrie regards experience as the only teacher. Holbach dwells on this same idea, and insists that experience is our only source of knowledge in all matters.[37] Holbach likewise teaches that man is a purely material being. He disbelieves in any spiritual reality whatsoever, and makes matter the only substance in the world. He lays stress, also, on one thought which is a natural consequence of La Mettrie's teaching. La Mettrie has limited the action of the will and has insisted that the will is dependent on bodily conditions. Holbach goes further and declares re-

[35] "Treatise on Man," Chap. XII, p. 161.
[36] *Ibid.*, Chap. IX, p. 146; Chap. VII, p. 129.
[37] "Système de la nature," Vol. I, Chap. I, p. 6.

peatedly that all freedom is a delusion, and that man is controlled in every action by rigid necessity.[38] This teaching seems to be the natural outcome of the belief that man is a machine.

Holbach's atheistic theology is more extreme than his predecessor's, for La Mettrie admits that God may exist, while Holbach vigorously opposes the possibility. Moreover, Holbach holds the opinion, barely suggested by La Mettrie, that an atheistic doctrine would ameliorate the condition of mankind.[39] He insists that the idea of God has hindered the progress of reason and interfered with natural law. Holbach is indeed the only one of the philosophers here discussed, who frankly adopts a fatalistic and atheistic doctrine of the universe. In these respects, his teaching is the culmination of French materialism.

[38] "Système de la nature," Vol I, Chap. VI, p. 94.

[39] *Ibid.*, Vol. II, Chap. XVI, p. 451, and Chap. XXVI, p. 485.

OUTLINE OF LA METTRIE'S METAPHYSICAL DOCTRINE.

I. Insistence on the Empirical Standpoint.

II. Arguments in Favor of Materialism:
   a. The "Soul" is Affected,
      1. By Disease.
      2. By Sleep.
      3. By Drugs.
      4. By Food.
      5. By Age and Sex.
      6. By Temperature and Climate.
   b. There is No Sharp Distinction Between Men and Animals (Machines).
   c. Bodily Movements are Due to the "Motive Power" of the Body.

III. Conception of Matter:
   a. Matter is Extended.
   b. Matter Has the Power of Motion.
   c. Matter Has the Faculty of Feeling.

IV. Conception of Man:
   a. Man is a Machine.
   b. All Man's Faculties Reduce to Sense and Imagination.
   c. Man is Like Animals in Being Capable of Education.
   d. Man is Ignorant of His Destiny.

V. Theological Doctrine:
   a. The Existence of God is Unproved and Practically Unimportant.
   b. The Argument from Design is Ineffective Against the Hypothesis of Mechanical Causality.
   c. Atheism Makes for Happiness.

NOTES.

NOTE ON FREDERICK THE GREAT'S EULOGY.

This translation is made from the third volume, pp. 159 ff. of Œuvres de Fréderic II., Roi de Prusse, Publiées du vivant de l'Auteur," Berlin, 1789.

La Mettrie was received at the court of Frederick the Great, when he had been driven from Holland on account of the heretical teaching of "L'Homme Machine," The "Eloge" was read by Darget, the secretary of the king, at a public meeting of the Academy of Berlin, to which, at the initiative of Frederick, La Mettrie had been admitted.

The careful reader will not fail to note that Frederick's arithmetic is at fault, and that La Mettrie died at the age of forty-one, not forty-three, years.

At a few points, perhaps, the *Eloge* demands elucidation. Coutances, like Caen, is a Norman town. St. Malo lies, just over the border, in Brittany. La Mettrie's military service was with the French in the Silesian wars against Maria Theresa. The battle of Dettingen was fought in Bavaria and was won by the Austrians through the aid given by George II of England to Maria Theresa. The battle of Fontenoy in the Netherlands was the only victory of the French in this war.

Other accounts of the life of La Mettrie are:

J. Assézat. Introduction to "L'Homme Machine," Paris, 1865.

F. A. Lange, "History of Materialism."

Ph. Damiron, "Histoire de la philosophie du dix-huitième siècle," Paris, 1858.

N. Quépat, "La philosophie matérialiste au XVIII^{e} siècle. Essai sur La Mettrie, sa vie, et ses œuvres." Paris, 1873.

NOTES ON MAN A MACHINE.

1. *"Matter may well be endowed with the faculty of thought."* Although La Mettrie attempts to "avoid this reef," by refraining from the use of these words, yet he asserts throughout his work that sensations, consciousness, and the soul itself are modifications of matter and motion.

The possibility of matter being endowed with the faculty of thought, is denied by Elie Luzac, the publisher of "L'homme machine," in his work "L'homme plus que machine." In this work he tries to disprove the conclusions of "L'homme machine." He says. "We have therefore proved by the idea of the inert state of matter, by that of motion, by that of relations, by that of activity, by that of extension, that matter can not be possessed of the faculty of thinking"...."To be brief, I say, that if, by a material substance, we understand that matter which falls under the cognizance of our senses, and which is endowed with the qualities we have mentioned, the soul can not be material: so that it must be immaterial, and, for the same reason, God could not have given the faculty of thinking to matter, since He can not perform contradictions."[1]

2. *"How can we define a being whose nature is absolutely unknown to us?"* La Mettrie uses this as an argument against the belief in a soul, and yet he later admits that the "nature of motion is as unknown to us as the nature of matter." It is difficult then to see why there is more reason to doubt the existence of spirit, than to doubt the existence of matter. Locke makes this point well. "It is for want of reflection that we are apt to think that our senses show us nothing but material things. Every act of sensation, when duly considered, gives us an equal view of both parts of nature, the corporeal and spiritual."[2]...."If this

1 "Man More than a Machine," pp. 10, 12. For statement of the editions to which these Notes make reference, see pp. 205-207.

2 Locke's "Essay Concerning Human Understanding," Book II, Chap. XXIII, § 15.

notion of immaterial spirit may have, perhaps, some difficulties in it not easy to be explained, we have therefore no more reason to deny or doubt the existence of such spirits, than we have to deny or doubt the existence of body because the notion of body is cumbered with some difficulties, very hard and perhaps impossible to be explained or understood by us."[3]

3. "*Author of the 'Spectacle de la nature.'*" Noel Antoine Pluche (1688-1761) was a Jansenist author. He was Director of the College of Laon, but was deprived of his position on account of his refusal to adhere to the bull "Unigenitus." Rollin then recommended him to Gasville, intendant of Normandy, who entrusted him with his son's education. He finally settled in Paris. His principal works are: "Spectacle de la nature," (Paris, 1739); "Mécanique des langues et l'art de les enseigner," (Paris, 1751); "Harmonie des Psaumes et de l'Evangile," (Paris, 1764); "Concorde de la géographie des différents ages," (Paris, 1765).[4]

La Mettrie describes Pluche in the "Essais sur l'esprit et les beaux esprits" thus: "Without wit, without taste, he is Rollin's pedant. A superficial man, he had need of the work of M. Reaumur, of whom he is only a stale and tiresome imitator in the flat little sayings scattered in his dialogues. It was with the works of Rollin as with the 'Spectacle de la Nature,' one made the fortune of the other; Gacon praised Person, Person praised Gacon, and the public praised them both."[5]

This quotation from La Mettrie occurs in Assézat's edition of La Mettrie's "L'homme machine," which was published as the second volume of the series "Singularités physiologiques" (1865). Assézat was a French publisher and writer. He was at one time Secretary of the Anthropological Society, and collaborated with other writers in the publication of "La Revue Nationale," "La Revue de Paris," and "La Pensée nouvelle." His notes to "L'Homme

[3] *Ibid.*, § 31.

[4] Condensed and translated from *La Grande Encyclopédie*. Vol. 26.

[5] Translated from a note of Assézat in "L'homme machine."

Machine" show great knowledge concerning physiological subjects. He intended to publish a complete edition of Diderot's works, but overwork on this undermined his health, so that he was unable to complete it.[6]

4. Torricelli was a physicist and mathematician who lived from 1608 to 1647. He was a disciple of Galileo, and acted as his amanuensis for three months before Galileo's death. He was then nominated as grand-ducal mathematician and professor of mathematics in the Florentine Academy. In 1643, he made his most famous discovery. He found that the height to which a liquid will rise in a closed tube, depends on the specific gravity of the liquid, and concludes from this that the column of liquid is sustained by atmospheric pressure. This discovery did away with the obscure idea of a *fuga vacui*, and laid bare the principle on which mercurial barometers are constructed. For a long time the mercurial thermometer was called the "Torricellian tube," and the vacuum which the barometer includes is still known as a "Torricellian vacuum."[7]

5. "*Only the physicians have a right to speak on this subject.*" Luzac says: "'Tis true that if the materiality of the soul was proved, the knowledge of her would be an object of natural philosophy, and we might with some appearance of reason reject all arguments to the contrary which are not drawn from that science. But if the soul is not material, the investigation of its nature does not belong to natural philosophy, but to those who search into the nature of its faculties, and are called metaphysicians."[8]

6. "*Man is....a machine.*" This is the first clear statement of this theory, which as the title of the work indicates, is the central doctrine of this work. Descartes had strongly denied the possibility of conceiving man as a ma-

6 Condensed and translated from *La Grande Encyclopédie.* Vol. 4.

7 Condensed from the *Encyclopaedia Britannica,* 9th ed., Vol. XXIII. All references are to this edition.

8 "Man More than a Machine," p. 5.

chine. "We may easily conceive a machine to be so constructed that it emits vocables, and even that it emits some correspondent to the action upon it of external objects which cause a change in its organs,....but not that it should emit them variously so as appositely to reply to what is said in its presence, as men of the lowest grade of intellect can do."[9]

7. "*Let us then take in our hands the staff of experience.*" La Mettrie repeatedly emphasizes the belief that knowledge must come from experience. Moreover he confines this experience to sense experience, and concludes "L'historie naturelle de l'âme" with these words: "No senses, no ideas. The fewer senses there are: the fewer ideas. No sensations experienced, no ideas. These principles are the necessary consequence of all the observations and experiences that constitute the unassailable foundation of this work."

This doctrine is opposed to the teaching of Descartes, who insists that "neither our imagination nor our senses can give us assurance of anything unless our understanding intervene."[10] Moreover Descartes believes that the senses are fallacious, and that the ideal method for philosophy is a method corresponding to that of mathematics.[11] Condillac and Holbach agree with La Mettrie's opinion. Thus, Condillac teaches that man is nothing more than what he has become by the use of his senses.[12] And Holbach says: "As soon as we take leave of experience, we fall into the chasm where our imagination leads us astray."[13]

8. "Galen (Galenus) Claudius, 130 to *circa* 210 A. D. An eminent Greek physician and philosopher. Born at Pergamus, Mysia, he studied both the Platonic and Peripatetic systems of philosophy. Satyrus instructed him in anatomy. He traveled extensively while young to perfect

9 "Discourse on Method," Part V.
10 "Discourse on Method," Part IV.
11 "Meditations," II.
12 "Traité des sensations." Part IV, Chap. IX, § 5.
13 Système de la nature," Vol. I, Chap. I.

his education. About 165 A. D. he moved to Rome, and became very celebrated as a surgeon and practising physician, attending the family of Marcus Aurelius. He returned to Pergamus, but probably visited Rome three or four times afterwards. He wrote in philosophy, logic, and medicine. Many, probably most, of his works are lost. He was the one medical authority for thirteen centuries, and his services to logic and to philosophy were also great."[14]

9. The author of "L'histoire de l'âme" is La Mettrie himself.

10. Hippocrates is often termed the "father of medicine." He was born in Cos in 460 B. C. He studied medicine under his father, Heraclides, and Herodicus of Selymbria; and philosophy under Gorgias and Democritus. He was the first to separate medicine from religion and from philosophy. He insisted that diseases must be treated by the physician, as if they were governed by purely natural laws. The Greeks had such respect for dead bodies that Hippocrates could not have dissected a human body, and consequently his knowledge of its structure was limited, but he seems to have been an acute and skilful observer of conditions in the living body. He wrote several works on medicine, and in one of them showed the first principles on which the public health must be based. The details of his life are hidden by tradition, but it is certain that he was regarded with great respect and veneration by the Greeks.[15]

11. "*The different combinations of these humors....*" Compare this with Descartes's statement that the difference in men comes from the difference in the construction and position of the brain, which causes a difference in the action of the animal spirits.[16]

12. "*This drug intoxicates, like wine, coffee, etc., each in its own measure, and according to the dose.*" Descartes

[14] Quoted from Baldwin's *Dictionary of Philosophy and Psychology*, Vol. I.

[15] Condensed from the *Encyclopaedia Britannica*, Vol. XI.

[16] "Les passions de l'ame," Part I, Art. XV, and Art. XXXIX.

also speaks of the effect of wine. "The vapors of wine, entering the blood quickly, go from the heart to the brain, where they are converted into spirits, which being stronger and more abundant than usual are capable of moving the body in several strange fashions."[17]

13. The quotation from Pope is from the "Moral Essays," published 1731 to 1735, Epistle I, 1, 69.

14. Jan Baptista Van Helmont (1578-1644) was a Flemish physician and chemist. He is noted for having demonstrated the necessity of the balance in chemistry, and for having been among the first to use the word "gas." His works were published as "Ortus Medicinae," 1648.[18].

15. The authorof "Lettres sur la physiognomie" was Jacques Pernety or Pernetti. He was born at Chazelle-sur-Lyon, was for some years canon at Lyons, and died there in 1777.[19]

16. Boerhaave. See Note 78.

17. Pierre Louis Moreau de Maupertuis (1698-1759) was a French mathematician, astronomer and philosopher. He supported the Newtonian theory against the Cartesians. In 1740 he became president of the Academy of Berlin. He was the head of the expedition which was sent by Louis XV to measure a degree of longitude in Lapland. Voltaire satirized Maupertuis in the "Diatribe du Docteur Akakia."[20]

18. Luzac sums up the preceding facts by saying: "Here are a great many facts, but what is it they prove? only that the faculties of the soul arise, grow, and acquire strength in proportion as the body does; so that these same faculties are weakened in the same proportion as the

17 *Ibid.*, Part I, Art. XV.

18 Condensed from the *Century Dictionary*, Vol. IX.

19 Translated and condensed from *La Grande Encyclopédie*, Vol. 26.

20 Condensed from the *Century Dictionary*, Vol. IX.

body is....But from all these circumstances it does not follow that the faculty of thinking is an attribute of matter, and that all depends on the manner in which our machine is made, that the faculties of the soul arise from a principle of animal life, from an innate heat or force, from an irritability of the finest parts of the body, from a subtile etheral matter diffused through it, or in a word, from all these things taken together."[21]

19. *"The diverse states of the soul are therefore always relative with those of the body."* This view is in diametrical opposition to the teaching of Descartes, who says: "The soul is of a nature wholly independent of the body."[22] Yet Descartes also states that there is an intimate connection between the two. "The Reasonable Soul ....could by no means be educed from the power of matter....it must be expressly created; and it is not sufficient that it be lodged in the human body, exactly like a pilot in a ship, unless perhaps to move its members, but....it is necessary for it to be joined and united more closely to the body, in order to have sensations and appetites similar to ours, and thus constitute a real man."[22]

Holbach later emphasizes this close connection between body and soul, which is so insisted upon by La Mettrie. "If free from our prejudices we wish to see our soul, or the moving principle which acts in us, we shall remain convinced that it is part of our body, that it can not be distinguished from the body except by an abstraction, that it is the body itself considered relatively to some of the functions or faculties to which its nature and particular organization make it susceptible. We shall see that this soul is forced to undergo the same changes as the body, that it grows and develops with the body....Finally we can not help recognizing that at some periods it shows evident signs of weakness, sickness, and death."[23]

20. "Peyronie (Francois Gigot de la), a French surgeon, born in Montpellier, the fifteenth of January, 1678,

21 "Man More than a Machine," p. 23.
22 "Discourse on Method," V, last paragraph.
23 "Système de la nature," Vol. I, Chap. VII.

died the twenty-fifth of April, 1747. He was surgeon of the hospital of Saint-Eloi de Montpellier and instructor of anatomy to the Faculty; then, in 1704, served in the army. In 1717 he became reversioner of the position of first surgeon to Louis XV; in 1731, steward of the Queen's palace; in 1735, a doctor of the King; in 1736, first surgeon of the King, and chief of the surgeons of the kingdom. The greatest merit of La Peyronie is for having founded the Academy of Surgery in Paris, and for having gained special protection for surgery and surgeons in France. He wrote little."[24]

21. "Willis, Thomas (1621-1675), English physician, was born at Great Bedwin, Wiltshire, on 27th January, 1621. He studied at Christ Church, Oxford; and when that city was garrisoned for the king he bore arms for the Royalists. He took the degree of bachelor of medicine in 1646, and after the surrender of the garrison applied himself to the practice of his profession. In 1660, shortly after the Restoration, he became Sedleian professor of natural philosophy in place of Dr. Joshua Cross, who was ejected, and the same year he took the degree of doctor of physic.....He was one of the first members of the Royal Society, and was elected an honorary fellow of the Royal College of Physicians in 1664. In 1666,.... he removed to Westminster, on the invitation of Dr. Sheldon, Archbishop of Canterbury....He died at St. Martin's on 11th November, 1675, and was buried in Westminster Abbey."[25]

22. Fontenelle, Bernard le Bovier de. Born at Rouen, France, February 11, 1657; died at Paris, January 9, 1757. A French advocate, philosopher, poet, and miscellaneous writer. He was the nephew (through his mother) of Corneille, and was 'one of the last of the Précieux, or rather the inventor of a new combination of literature and gallantry which at first exposed him to not a little satire' (Saintsbury). He wrote 'Poésies pastorales' (1688), "Dialogues des morts' (1683) 'Entretiens sur la pluralité des

[24] "Translated from *La Grande Encyclopédie,* Vol. 26.
[25] Quoted from the *Encyclopaedia Britannica,* Vol. XXIV.

mondes' (1686), 'Histoire des oracles' (1687), 'Eloges des académiciens' (delivered 1690-1740."[26]

23. *"In a word, would it be absolutely impossible to teach the ape a language? I do not think so."* Compare with this Haeckel's statement of the relation between man's speech and that of apes. "It is of especial interest that the speech of apes seems on physiological comparison to be a stage in the formation of articulate human speech. Among living apes there is an Indian species which is musical; the *hylobates syndactylus* sings a full octave in perfectly pure harmonious half-tones. No impartial philologist can hesitate any longer to admit that our elaborate rational language has been slowly and gradually developed out of the imperfect speech of our Pliocene simian ancestors."[27]

24. Johann Conrad Amman was born at Schaffhausen, in Switzerland, in 1669. After his graduation at Basle, he practised medicine at Amsterdam. He devoted most of his attention to the instruction of deaf mutes. He taught them by attracting their attention to the motion of his lips, tongue, and larynx, while he was speaking, and by persuading them to imitate these motions. In this way, they finally learned to articulate syllables and words, and to talk. In his works "Surdus Loquens," and "Dissertatio de Loquela," he explained the mechanism of speech, and made public his method of instruction. From all accounts it seems that his success with the deaf mutes was remarkable. He died about 1730.[28]

25. *".... the great analogy between ape and man ...."* Compare Haeckel: "Thus comparative anatomy proves to the satisfaction of every unprejudiced and critical student the significant fact that the body of man and that of the anthropoid ape are not only peculiarly similar, but

[26] Quoted from the *Century Dictionary,* Vol. IX.
[27] E. Haeckel, "The Riddle of the Universe," Chap. III.
[28] Condensed from the *Encyclopaedia Britannica,* Vol. I.

they are practically one and the same in every important respect."[29]

26. Sir William Temple was born in London in 1628. He attended the Puritan College of Emmanuel, Cambridge, but left without taking his degree. After an extensive tour on the continent, he settled in Ireland in 1655. His political career began with the accession of Charles II in 1660. He is particularly noted for concluding "The Triple Alliance" between England, the United Netherlands, and Sweden, and for his part in bringing about the marriage of William and Mary, which completed the alliance of England and the Netherlands. Temple was not as successful in political work at home as abroad, for he was too honest to care to be concerned in the intrigues in English affairs, at that time. He retired from politics and died at Moor Park in 1699.

Temple wrote several works on political subjects. His "Memoirs" were begun in 1682; the first part was destroyed before it was published, the second part was published without his consent, and the third part was published by Swift after Temple's death. His fame rests more on his diplomatic work than on his writings.[30]

27. "Trembley (Abraham) a Swiss naturalist, born in Geneva, the third of September, 1700, died in Geneva, the twelfth of May, 1784. He was educated in his native city, and in the Hague, where he became tutor of the son of an English resident, and later the tutor of the young duke of Richmond, with whom he traveled in Germany and Italy. In 1760, he obtained the position of librarian at Geneva, and gained a seat in the council of the 'Two Hundred.' His admirable works on the fresh-water snake procured for him his election as member of the Royal Society of London, and as correspondent of the Academy of Sciences in Paris. From 1775 to 1782 he published several works on natural religion, and articles on natural history in 'Philosophical Transactions,' 1742-57. His most important

[29] "The Riddle of the Universe," Chap. II.

[30] Condensed from the *Encyclopaedia Britannica*, Vol. XXIII.

work is 'Mémoires pour servir à l'histoire d'un genre de polype d'eau douce' (Leyden, 1744; Paris, 2 volumes).[31]

28. *"What was man before the invention of words and the knowledge of language? An animal."* Compare this with the statement of Hobbes: "The most noble and profitable invention of all others was that of Speech, consisting of names or appellations, and their connexion ....without which there had been amongst men neither commonwealth, nor society, no contract, nor peace, no more than amongst lions, bears, and wolves."[32]

29. Fontenelle. See note 22.

30. *"All the faculties of the soul can be correctly reduced to pure imagination."* Compare with this La Mettrie's statement in "L'histoire naturelle de l'âme": "The more one studies all the intellectual faculties, the more convinced one remains, that they are all included in the faculty of sensation, upon which they all depend so essentially that without it the soul could never perform any of its functions."[33] This resembles Condillac's doctrine of sensation: "Judgment, reflexion, desires, passions, etc., are nothing buut sensation itself which is transformed in diverse ways."[34] Helvetius also says: "All the operations of the mind are reducible to sensation."[35]

31. *"See to what one is brought by the abuse of language, and by the use of those fine words (spirituality, immateriality, etc.)."* Compare Hobbes, "Though men may put together words of contradictory signification, as *spirit* and *incorporeal;* yet they can never have the imagination of anything answering to them."[36]

31 Translated from *La Grande Encyclopédie,* Vol. 31.
32 "Leviathan," Part I, Chap. IV.
33 "L'histoire naturelle de l'ame," Chap. XIV. p. 199.
34 "Traité des sensations," p. 50. Cf. *ibid.,* Chap. XII (2).
35 "Treatise on Man," Sect. II, Chap. I, p. 4. Cf. "Essays on Mind," Essay I, Chap. I, p. 7.
36 "Leviathan," Part I, Chap. XII.

32. *"Man's preëminent advantage is his organism."* Luzac says: "This no more proves that organization is the chief merit of man, than that the form of a musical instrument constitutes the chief merit of the musician. In proportion to the goodness of the instrument, the musician charms by his art, and the case is the same with the soul. In proportion to the soundness of the body, the soul is in better condition to exert her faculties."[37]

33. *"Such is, I think, the generation of intelligence."* Luzac argues against this statement thus: "But if thought and all the faculties of the soul depended on the organization as some pretend, how could the imagination draw a long chain of consequences from the objects it has embraced?"[38]

34. Pyrrhonism is "the doctrine of Pyrrho of Elis which has been transmitted chiefly by his disciple Timon. More generally, radical Scepticism in general."[39]

35. Pierre Bayle was born at Carlat in 1647. Although the child of Protestant parents, he was converted by the Jesuits. After his reconversion to Protestantism, he was driven out of France, and took refuge first in Geneva, and then in Holland. In 1675 he became professor of philosophy at the Protestant College of Sedan, and in 1681 professor of philosophy and history at Rotterdam. In 1693 he was forced to resign from his position on account of his religious views.

Bayle was one of the leading French sceptics of the time. He was a Cartesian, but questioned both the certainty of one's own existence, and the knowledge derived from it. He declared that religion is contrary to the human reason, but that this fact does not necessarily destroy faith. He distinguished religion not only from science, but also from morality, and vigorously opposed those who considered a certain religion necessary for morality. He

37 "Man More than a Machine," p. 25.
38 *Ibid.*, p. 26.
39 Quoted from Baldwin's *Dictionary of Philosophy*, Vol. II.

did not openly attack Christianity, yet all that he wrote awakened doubt, and his work exerted an extensive influence for scepticism.

His principal work is the "Dictionnaire historique et critique," published 1695-1697, and containing a vast amount of knowledge, expressed in a piquant and popular style. This fact made the book widely read both by scholars and by superficial readers.

36. Arnobius the Elder was born at Sicca Venerea in Numidia, in the latter part of the third century A. D. He was at first an opponent of Christianity, but was afterwards converted, and wrote "Adversus Gentes" as an apology for Christianity. In this work, he tries to answer the complaints made against Christians on the ground that the disasters of the time were due to their impiety; vindicates the divinity of Christ; and discusses the nature of the human soul. He concludes that the soul is not immortal, for he believes that the belief in the immortality of the soul would have a deteriorating influence on morality. For translation of his work compare Vol. XIX of the "Ante-Nicene Christian Library."[40]

37. *"There exists no soul or sensitive substance without remorse."* Condillac had said: "There is something in animals besides motion. They are not pure machines: they feel."[41] La Mettrie also attributed remorse to animals, but believed that they are none the less machines. Luzac said in comment: "What renders these systems completely ridiculous, is, that the persons who pronounce men machines, give them properties which belie their assertion. If beings, are but machines, why do they grant a natural law, an internal sense, a kind of dread? These are ideas which can not be excited by objects which operate on our senses."[42]

38. *"Nature has created us solely to be happy."* This is a statement of the doctrine, which La Mettrie developes

40 Condensed from the *Encyclopaedia Britannica,* Vol. II.
41 "Traité des animaux," Chap. I, p. 454.
42 "Man More than a Machine," p. 65.

in his principal ethical work "Discours sur le Bonheur." He teaches that happiness rests upon bodily pleasure and pain. In "L'histoire naturelle de l'âme," La Mettrie states that all the passions can be developed from two fundamental passions, of which they are but modifications, love and hatred, or desire and aversion.[43] Like La Mettrie, Helvetius makes corporeal pleasure and pain the ruling motives for man's conduct. Thus he writes: "Pleasure and pain are and always will be the only principles of action in man."[44]...."Remorse is nothing more than a foresight of bodily pain to which some crime has exposed us."[45] He definitely makes happiness the end of human action. "The end of man is self-preservation and the attainment of a happy existence.....Man, to find happiness, should save up his pleasures, and refuse all those which might change into pains....The passions always have happiness as an object: they are legitimate and natural, and can not be called good or bad except on account of their influence on human beings. To lead men to virtue, we must show them the advantages of virtuous actions."[46] Holbach, finally, goes further than La Mettrie or Helvetius, and makes purely mechanical impulses the motives of man's action. "The passions are ways of being or modifications of the internal organs, attracted or repulsed by objects, and are consequently subject in their own way to the physical laws of attraction and repulsion."[47]

39. "*Ixions of Christianity.*" Ixion, for his treachery, stricken with madness, was cast into Erebus, where he was continually scourged while bound to a fiery wheel, and forced to cry: "Benefactors should be honored."

40. "*Who can be sure that the reason for man's existence is not simply the fact that he exists?*" Luzac opposes this by saying: "If the reason of man's existence was in man himself, this existence would be a necessary conse-

43 "L'histoire naturelle de l'ame," Chap. X, § XII.
44 "Treatise on Man," Chap. X.
45 *Ibid.*, Chap. VII.
46 "Le vrai sens du système de la nature," Chap. IX.
47 *Ibid.*, Vol. I, Chap. VIII, p. 140.

quence of his own nature; so that his own nature would contain the cause or reason of his existence. Now since his own nature would imply the cause of his existence, it would also imply his existence itself, so that man could no more be considered as non-existent than a circle can be considered without radii or a picture without features or proportions....If the existence of man was in man himself, he would then be an invariable being."[48]

41. "Fénelon (Francois de Salignac de la Mothe-Fénelon), born at Château de Fénelon, Dordogne, France, August 6, 1651, died at Cambrai, France, January 7, 1715. A celebrated French prelate, orator, and author. He became preceptor of the sons of the dauphin in 1689, and was appointed archbishop of Cambrai in 1695. His works include 'Les aventures de Télémaque' (1699), 'Dialogues des morts' (1712), 'Traité de l'éducation des filles' (1688), 'Explication des maximes des saints' (1697), etc. His collected works were edited by Leclère (38 vols., 1827-1830)."[49]

42. "Nieuwentyt (Bernard), a Dutch mathematician, born in Westgraafdak the tenth of August 1654, died at Purmerend the thirtieth of May, 1718. An unrelenting Cartesian, he combated the infinitesimal calculus, and wrote a polemic against Leibnitz, concerning this subject. He wrote a theological dissertation translated into French under the title "L'existence de Dieu démontrée par les merveilles de la nature' (Paris, 1725)."[50]

43. "Abadie, James (Jacques), born at Nay, Basse-Pyrénées, probably in 1654; died at London, September 25, 17225. A noted French Protestant theologian. He went to Berlin about 1680 as minister of the French church there, and thence to England and Ireland; was for a time minister of the French church in the Savoy; and settled in Ireland as dean of Killaloe in 1699. His chief work is the 'Traité

48 "Man More than a Machine," pp. 71 and 72.
49 Quoted from the *Century Dictionary*, Vol. IX.
50 Translated from *La Grande Encyclopédie*, Vol. 24.

de la vérité de la religion chrétienne' (1684), with its continuation 'Traité de la divinité de nôtre Seigneur Jesus-Christ' (1689),"[51]

44. "Derham (William), English theologian and scholar, born in Stoughton, near Worcester, in 1657, died at Upminster in 1735. Pastor of Upminster in the county of Essex, he could peacefully devote himself to his taste for mechanics and natural history. Besides making studies of watch-making, and of fish, birds, and insects, published in part in the *Transactions of the Royal Society*, he wrote several works on religious philosophy. The most important, which was popular for a long time and was translated into French (1726), has as title 'Physico-Theology, or the Demonstration of the Existence and the Attributes of God, by the Works of His Creation' (1713). He wrote as complement, in 1714, his 'Astro-Theology, or the Demonstration of the Existence and Attributes of God by the Observation of the Heavens.' "[52]

45. Rais, or Cardinal de Retz (1614-1679), was a French politician and author. From his childhood he was intended for the church. He took an active part in the movement against Cardinal Mazarin, and later became cardinal, but lost his popularity, and was imprisoned at Vincennes. After escaping from there he returned to France and settled in Lorraine, where he wrote his 'Mémoires,' which tell of the court life of his time.[53]

46. Marcello Malpighi (1628-1694) was a renowned Italian anatomist and physiologist. He held the position of lecturer on medicine at Bologna in 1656, a few months later became professor at Pisa, was made professor at Bologna in 1660, went from there to Messina, though he later returned to Bologna. In 1691 he became physician to Pope Innocent XII. Malpighi is often known as the founder of microscopic anatomy. He was the first to see the marvelous spectacle of the circulation of the blood on

[51] Quoted from the *Century Dictionary*, Vol. IX.
[52] Translated from *La Grande Encyclopédie*, Vol. 14.
[53] Condensed from the *Century Dictionary*, Vol. X.

the surface of a frog's lung. He discovered the vesicular structure of the human lung, the structure of the secreting glands, and the mucous character of the lower stratum of the epidermis. He was the first to undertake the finer anatomy of the brain, and he accurately described the distribution of grey matter, and of the fibre tracts in the cord. His works are: "De pulmonibus" (Bologna, 1661), "Epistolae anatomicae narc. Malpighi et Car. Fracassati" (Amsterdam, 1662), "De Viscerum Structura" (London, 1669), "Anatome Plantarum" (London, 1672), "De Structura Glandularum conglobatarum" (London, 1689).[54]

47. Deism is a system of thought which arose in the latter part of the seventeenth century. Its most important representatives in England were Toland, Collins, Chubb, Shaftsbury, and Tindal. They insisted on freedom of thought and speech, and claimed that reason is superior to any authority. They denied the necessity of any supernatural revelation, and were consequently vigorously opposed by the church. Partly because of this opposition by the church, many of them argued against Christianity, and tried to show that an observance of moral laws is the only religion necessary for man. They taught that happiness is man's chief end, and that, since man is a social being, his happiness can best be gained by mutual helpfulness. Although they declared that nature is the work of a perfect being, they had a mechanical conception of the relation of God to the world, and did not, like later theists, find evidence of God's presence in all the works of nature.[55]

48. "Vanini, Lucilio, self-styled Julius Cæsar. Born at Taurisano, kingdom of Naples, about 1585; burned at the stake at Toulouse, France, February 19, 1619. An Italian free thinker, condemned to death as an atheist and magician. He studied at Rome and Padua, became a priest, traveled in Germany and the Netherlands, and began teaching at Lyons, but was obliged to flee to England,

54 Condensed from the *Encyclopaedia Britannica*, Vol. XV.

55 Cf. A. W. Benn, "History of English Rationalism," Vol. I, Chap. III.

where he was arrested. After his release he returned to Lyons, and about 1617 settled at Toulouse. Here he was arrested for his opinions, condemned, and on the same day executed. His chief works are: 'Amphitheatrum aeternae Providentiae' (1615), 'De admirandis naturae reginae deaeque mortalium arcanis' (1616).[56]

49. Desbarreaux (Jacques Vallée). A French writer, born at Paris in 1602, who died at Chalon-sur-Saône the ninth of May, 1673. He wrote a celebrated sonnet on penitence, but was rather an unbeliever and sceptic than a penitent. Guy Patin, hearing of his death, said: "He infected poor young people by his licence. His conversation was very dangerous and destructive to the public."[57]

50. Boindin (Nicolas), French scholar and author, born the twenty-ninth of May, 1676, at Paris, where he died the thirtieth of November, 1751. He was in the army for a while, but retired on account of ill health. He then gave himself up to literature, and wrote several plays. In 1706 he was elected Royal censor and associate of the Academy of Inscriptions. His liberty, or, as it was then called, license of mind, shut the doors of the French Academy to him, and would have caused his expulsion from the Academy of Inscriptions if he had not been so old. He died without retracting his opinions.[58]

51. Denis Diderot (1713-1784), was one of the leaders of the intellectual movement of the eighteenth century. He was at first influenced by Shaftsbury, and was enthusiastic in his support of natural religion. In his "Pensées philosophiques" (1746) he tries to show that the discoveries of natural science are the strongest proofs for the existence of God. The wonders of animal life are enough to destroy atheism for ever. Yet, while he opposes atheism, he also opposes vigorously the intolerance and bigotry of the church. He claims that many of the attributes

[56] Quoted from the *Century Dictionary*, Vol. X.

[57] Translated and condensed from *La Grande Encyclopédie*, Vol. 14.

[58] Translated and condensed from *La Grande Encyclopédie*, Vol. 7.

ascribed to God are contrary to the very idea of a just and loving God.

Later, Diderot was influenced by La Mettrie and by Holbach, and became an advocate of materialism which he set forth in "Le rêve d'Alembert" and in the passages contributed to the "Système de la nature." Diderot was the editor of the "Encyclopédie."[59]

52. Trembley. See note 227.

53. *"Nothing which happens, could have failed to happen."* An enunciation of the doctrine so insisted upon by Holbach. "The whole universe....shows us only an immense and uninterrupted chain of cause and effect."[60].... "Necessity which regulates all the movements of the physical world, controls also those of the moral world."[61]

54. *"All these evidences of a creator, repeated thousands ....of times....are self-evident only to the anti-Pyrrhonians."* La Mettrie holds an opinion contrary not only to that of Descartes and Locke, but also to that of Toland, Hobbes, and Condillac. Descartes, for instance, says: "Thus I very clearly see that the certitude and truth of all science depends on the knowledge alone of the true God."[62] Hobbes asserts: "For he that from any effect he seeth come to pass should reason to the next and immediate cause thereof, and from thence to the cause of that cause,....shall at last come to this, that there must be, as even the heathen philosophers confessed, one first mover, that is a first and an eternal cause of all things, which is that which men mean by the name of God."[63] Toland's words are: "All the jumbling of atoms, all the Chances you can suppose for it, could not bring the Parts of the Universe into their present Order, nor continue them in the same, nor cause the Organization of a Flower

59 Condensed from F. A. Lange, "History of Materialism," Vol. II, Chap. 1, and from W. Windelband, "History of Philosophy," Part V, Chap. 1.

60 "Système de la nature." Vol. I, Chap. I, p. 12.

61 *Ibid.*, Vol. II, Chap. XI. Cf. Vol I, Chap. VII.

62 Meditations," III and V.

63 "Leviathan." Part I, Chap. XII.

or a Fly.....The Infinity of Matter....excludes....an extended corporeal God, but not a pure Spirit or immaterial Being."[64] Condillac writes: "A first cause, independent, unique, infinite, eternal, omnipotent, immutable, intelligent, free, and whose providence extends over all things: that is the most perfect notion of God that we can form in this life."[65] Locke declares: "From what has been said it is plain to me we have a more certain knowledge of the existence of a God than of anything our senses have not immediately discovered to us. Nay I presume I may say, that we more certainly know that there is a God, than that there is anything else without us."[66]

55. "Lucretius (Titus Lucretius Carus). Born at Rome, probably about 96 B. C., died October 15, 55 B. C. A celebrated Roman philosophical poet. He was the author of 'De rerum natura,' a didactic and philosophical poem in six books, treating of physics, of psychology, and (briefly) of ethics from the Epicurean point of view, He committed suicide probably in a fit of insanity. According to a popular but doubtless erroneous tradition, his madness was due to a love-philter administered to him by his wife."[67]

56. "Lamy (Bernard) was born in Mans in the year 1640. He studied first in the college of this city. He later went to Paris, and at Saumar studied philosophy under Charles de la Fontenelle, and theology under André Martin and Jean Leporc. He was at length called to teach philosophy in the city of Angers. He wrote a great many books on theological subjects. His philosophical works are: 'L'art de parler' (1675), 'Traité de méchanique, de l'équilibre, des solides et des liqueurs' (1679), 'Traité de la grandeur en général' (1680), 'Entretiens sur les sciences' (1684), 'Eléments de géométrie,' (1685)."[68]

64 "Letters to Serena," V, p. 235.

65 "Traité des animaux." Chap. VI, p. 585.

66 "Essay Concerning Human Understanding," Book IV, Chap. X.

67 Quoted from the *Century Dictionary*, Vol. IX.

68 Translated and condensed from the *Dictionnaire des Sciences philosophiques*, Vol. III, Paris, 1847.

57. *The eye sees only because it is formed and placed as it is.*" La Mettrie doubts whether there is any purpose in the world. Condillac, on the other hand, teaches that purpose and intelligence are shown forth in the universe. "Can we see the order of the parts of the universe, the subordination among them, and notice how so many different things compose such a permanent whole, and remain convinced that the cause of the universe is a principle without any knowledge of its effects, which without purpose, without intelligence, relates each being to particular ends, subordinated to a general end?"[69]

58. "Non nostrum inter vos tantas componere lites." Vergil, Eclogue III, line 108.

59. "*The universe will never be happy unless it is atheistic.*" Although La Mettrie calls this a "strange opinion" it is clear that he secretly sympathizes with it.

[69] "Traité des animaux," Chap. VI.

Holbach affirms this doctrine very emphatically. "Experience teaches us that sacred opinions were the real source of the evils of human beings. Ignorance of natural causes created gods for them. Imposture made these gods terrible. This idea hindered the progress of reason."[70] "An atheist....is a man who destroys chimeras harmful to the human race, in order to lead men back to nature, to experience, and to reason, which has no need of recourse to ideal powers, to explain the operations of nature."[71]

60. "*The soul is therefore but an empty word.*" Contrast this with Descartes's statement: "And certainly the idea I have of the human mind....is incomparably more distinct than the idea of any corporeal object."[72] Compare this doctrine, also, with Holbach's assertion: "Those who have distinguished the soul from the body seem to have only distinguished their brains from themselves. Truly the brain is the common center, where all the

[70] "Système de la nature." Vol. II, Chap. XVI, p. 451.

[71] *Ibid.*, Chap. XXVI, p. 485. Cf. Luzac's criticism in "Man More than a Machine," p. 94.

nerves spread in all parts of the human body, terminate and join together.....The more experience we have, the more we are convinced that the word 'spirit' has no meaning even to those who have invented it, and can be of no use either in the physical or in the moral world."[73]

61. William Cowper (1666-1709) was an English anatomist. He was drawn into a controversy with Bidloo, the Dutch physician, by publishing under his own name Bidloo's work on the anatomy of human bodies. His principal works are: "Myotamia reformata" (London, 1694) and "Glandularum descriptio" (1702).[74]

62. William Harvey (1578-1657), an English physician and physiologist, is renowned for his discovery of the circulation of the blood. He was educated at Canterbury and Cambridge, and took his doctor's degree at Cambridge in 1602. During his life he held the position of Lumleian lecturer at the College of Physicians, and of physician extraordinary to James I. His principal works are "Exercitatio de motu cordis et sanguinis" (1628), and "Exercitationes de generatione animalium" (1651).[75]

63. Francis Bacon (1551-1626) was one of the first to revolt against scholasticism and to introduce a new method into science and philosophy. He claimed that to know reality, and consequently to gain new power over reality, man must stop studying conceptions, and study matter itself. Yet he did not himself know how to gain a more accurate knowledge of nature, so that he could not put into practice the method which he himself advocated. His works are full of scholastic conceptions, though many of the implications of his system are materialistic. Lange claims,[76] indeed, that if Bacon had been more consistent and daring, he would have reached

72 "Meditations," IV.

73 "Système de la nature," Vol. I, Chap. VII, pp. 121-122.

74 Condensed and translated from *La Grande Encyclopédie,* Vol. 13.

75 Condensed from the *Century Dictionary,* Vol. IX.

76 F. A. Lange, "History of Materialism," Vol. I, Sec. II, Chap. III.

strictly materialistic conclusions. The account of the motion of the heart of the dead convict is found in "Sylva Sylvarum."[77] This book, published in 1627, a year after Bacon's death, contains the account of Bacon's experiments, and of his theories in matters of physiology, physics, chemistry, medicine, and psychology.

64. Robert Boyle, one of the greatest natural philosophers of his age, studied at Eton for three years, and then became the private pupil of the rector of Stalbridge. He traveled through France, Switzerland, and Italy, and while at Florence, studied the work of Galileo. He decided to devote his life to scientific work, and in 1645 became a member of a society of scientific men, which later grew into the Royal Society of London. His principal work was the improvement of the air-pump, and by that the discovery of the laws governing the pressure and volume of gases.

Boyle was also deeply interested in theology. He gave liberally for the work of spreading Christianity in India and America, and by his will endowed the "Boyle Lectures" to demonstrate the Christian religion against atheists, theists, pagans, Jews, and Mohammedans.[78]

65. Nicolas Sténon was born at Copenhagen, 1631, and died at Schwerin in 1687. He studied at Leyden and Paris, and then settled in Florence, where he became the physician of the grand duke. In 1672 he became professor of anatomy at Florence, but three years later he gave up this position and entered the church. In 1677 he was made Bishop of Heliopolis and went to Hanover, then to Munster, and finally to Schwerin. His principal work is the "Discours sur l'anatomie du cerveau" (Pars, 1669).[79]

66. La Mettrie's account of involuntary movements is much like that of Descartes. Descartes says: "If any

77 "Sylva Sylvarum sive Historia Naturalis Latio Transcripta, a J. Gruteo. Lug. Batavos, 1648. Cf. Bk. IV, Experiment 400.

78 Condensed from the *Encyclopaedia Britannica*, Vol. IV.

91 Translated and condensed from *La Grande Encyclopédie*, Vol. 30.

one quickly passes his hand before our eyes as if to strike us, we shut our eyes, because the machinery of our body is so composed that the movement of this hand towards our eyes excites another movement in the brain, which controls the animal spirits in the muscles that close the eyelids."[80]

67. "*The brain has its muscles for thinking, as the legs have muscles for walking.*" Neither Condillac not Helvetius go so far. Helvetius explicitly states that it is an open question whether sensation is due to a material or to a spiritual substance.[81]

68. Giovanni Alfonso Borelli (1608-1679) was the head of the so-called iatro-mathematical sect. He tried to apply mathematics to medicine in the same way in which it had been applied to the physical sciences. He was wise enough to restrict the application of his system to the motion of the muscles, but his followers tried to extend its application and were led into many absurd conjectures. Borelli was at first professor of mathematics at Pisa, and later professor of medicine at Florence. He was connected with the revolt of Messina and was obliged to leave Florence. He retired to Rome, where he was under the protection of Christina, Queen of Sweden, and remained there until his death in 1679.[82]

69. "*For one order that the will gives, it bows a hundred times to the yoke.*" Descartes, on the other hand, teaches that the soul has direct control over its voluntary actions and thoughts, and indirect control over its passions.[83] La Mettrie goes further than to limit the extent of the will, and questions whether it is ever free: "The sensations which affect us decide the soul either to will or not to will, to love or to hate these sensations according to the pleasure or the pain which they cause in

[80] "Les passions de l'ame," Part I. Art. 13.
[81] "Essays on the Mind," Essay I, Chap. I, 66. 4ff.
[82] Condensed from the *Encyclopaedia Britannica*, Vol. IV.
[83] "Les passions de l'ame," Part I, Art. 41.

us. The state of the soul thus determined by its sensations is called the will.[84] Holbach insists on this point and contends that all freedom is a delusion. "[Man's] birth depends on causes entirely outside of his power; it is without his permission that he enters this system where he has a place; and without his consent that, from the moment of his birth to the day of his death, he is continually modified by causes that influence his machine in spite of his will, modify his being, and alter his conduct. Is not the least reflexion enough to prove that the solids and fluids of which the body is composed, and that the hidden mechanism that he considers independent of external causes, are perpetually under the influence of these causes, and could not act without them? Does he not see that his temperament does not depend on himselt, that his passions are the necessary consequences of his temperament, that his will and his actions are determined by these same passions, and by ideas that he has not given to himself?....In a word, everything should convince man that during every moment of his life, he is but a passive instrument in the hands of necessity."[85]

70. The theory of animal spirits, held by Galen and elaborated by Descartes, is that the nerves are hollow tubes containing a volatile liquid, the animal spirits. The animal spirits were supposed to circulate from the periphery to the brain and back again, and to perform by their action all the functions of the nerves.

71. Berkeley uses the fact that the color of objects varies, as one argument for his idealistic conclusion.[86]

72. It is hard to tell what Pythagoras himself taught, but it is certain that he taught the kinship of animals and men, and upon this kinship his rule for the abstinence from flesh was probably based. Among the writings of the

84 "L'histoire naturelle de l'ame," Chap. XII, p. 164. Cf. Chap. XII, p. 167.

85 "Système de la nature," Vol. I, Chap. VI, pp. 89ff.

86 "Dialogues Between Hylas and Philonous," I, Open Court edition; pp. 27, 28, 29. Cf. "Principles of Human Knowledge," par. 10, 15.

later Pythagoreans we find strange rules for diet which are plainly genuine taboos. For example they are commanded "to abstain from beans, not to break bread, not to eat from a whole loaf, not to eat the heart, etc."[87]

73. Plato forbade the use of wine in his ideal republic.[88]

74. *"Nature's first care, when the chyle enters the blood, is to excite in it a kind of fever."* Thus, warmth is the first necessity for the body. Compare with this, Descartes's statement: "There is a continual warmth in our heart,....this fire is the bodily principle of all the movements of our members."[89] This is one of the many instances in which La Mettrie's account of the mechanism of the body is similar to that of Descartes.

75 "Stahl (George Ernst), born at Ansbach, Bavaria, October 21, 1660; died at Berlin, May 14, 1734. A noted German chemist, physician of the King of Prussia from 1716. His works include: 'Theoria medica vera' (1707), 'Experimenta et observationes chemicae' (1731), etc."[90]

76. Philip Hecquet (1661-1737) was a celebrated French physician. He studied at Rheims, and in 1688 became the physician of the nuns of Port Royal des Champs. He returned to Paris in 1693 and took his doctor's degree in 1697. He was twice dean of the faculty of Paris. In 1727 he became the physician of the religious Carmelites of the suburg of Saint Jacques, and remained their physician for thirty-two years.[91]

77. The quotation: *"All men may not go to Corinth,"* is translated from Horace, Ep. 1, 19, 36. "Non cuivis homini contigit adire Corinthum."

87 Quoted from J. Burnet, "Early Greek Philosophy," Chap. II.
88 Republic, III, 403.
89 "Les passions de l'ame," Part I, Art. VIII.
90 Quoted from the *Century Dictionary*, Vol. X.
91 Translated and ccondensed from *La Grande Encyclopèdie*, Vol. 19.

78. Hermann Boerhaave was born at Voorhout near Leyden, on December 31, 1668. His father, who belonged to the clerical profession, destined his son for the same calling and so gave him a liberal education. At the University of Leyden, he studied under Gronovius, Ryckius and Frigland. At the death of his father, Boerhaave was left without any provision and supported himself by teaching mathematics. Vandenberg, the burgomaster of Leyden, advised him to study medicine, and he decided to devote himself to this profession. In 1693 he received his degree and began to practice medicine. In 1701 he was made "Lecturer on the Institutes of Medicine" at the University of Leyden. Thirteen years later he was appointed Rector of the University, and the same year became Professor of Practical Medicine there. He introduced into the university the system of clinical instruction. Boerhaave's merit was widely recognized, and his fame attracted many medical students from all Europe to the University of Leyden. Among these was La Mettrie whose whole philosophy was profoundly influenced by the teaching of Boerhaave. In 1728 Boerhaave was elected into the Royal Academy of Sciences of Paris, and two years later he was made a member of the Royal Society of London. In 1731 his health compelled him to resign the Rectorship at Leyden. At this time he delivered an oration, "De Honore, Medici Servitute." He died after a long illness on April 23, 1738. The city of Leyden erected a monument to him in the Church of St. Peter, and inscribed on it: "Salutifero Boerhaavii genio Sacrum."

Boerhaave was a careful and brilliant student, an inspiring teacher, and a skilful practitioneer. There are remarkable accounts of his skill in discovering symptoms, and in diagnosing diseases. His chief works are: "Institutiones Medicae" (Leyden, 1708); "Aphorismi de cognoscendis et curandis Morbis" (Leyden, 1709), "Libellus de Materia Medica et Remediorum Formulis" (Leyden,

1719), "Institutiones et Experimentae Chemicae" (Paris, 1724).[92]

79. Willis. (See Note 21.)

80. Claude Perrault (1613-1688) was a French physician and architect. He received his degree of doctor of medicine at Paris and practised medicine there. In 1673 he became a member of the Royal Academy of Sciences. Although he never abandoned his work in mathematics, in the natural sciences, and in medicine, he is more noted as an architect than as a physician or scientist. He was the architect of one of the colonnades of the Louvre, and of the Observatory.[93]

81. "*Matter is self-moved.*" In "L'histoire naturelle de l'âme" La Mettrie claims that motion is one of the essential properties of matter. See "L'histoire naturelle de l'âme," Chap. V.

82. "*The nature of motion is as unknown to us as that of matter.*" Unlike La Mettrie, Toland holds that it is possible to know the nature of matter, and declares that motion and matter can not be defined, because their nature is self-evident,[94] Holbach, resembling La Mettrie, teaches that it is futile to seek to know the ultimate nature of matter, or the cause for its existence. "Thus if any one shall ask whence matter came, we shall say that it has always existed. If any one ask, whence came movement in matter, we shall answer that for this same reason matter must have moved from eternity, since motion is a necessary consequence of its existence, its essence, and of its primitive properties, such as extent, weight, impenetrability, shape, etc.....The existence of matter is a fact; the existence of motion is another fact."[95]

92 Condensed from the *Encyclopaedie Britannica*, Vol. III.

93 Translated and condensed from *La Grande Encyclopédie*, Vol. 26.

94 "Letters to Serena," V.

95 "Système de la nature," Vol. II, Chap. II, p. 32.

83. Huyghens (Christian) was born at The Hague, 1629, and died there in 1695. He was a Dutch physicist, mathematician, and astronomer. He is celebrated for the invention of the pendulum clock which could measure the movements of the planets, for the improvement of the telescope, and for the development of the wave-theory of light. His principal work is "Horologium Oscillatorium" (1673).[96]

84. Julien Leroy (1686-1759) was a celebrated French watchmaker. He excelled in the construction of pendulums and of large clocks. Some have attributed the construction of the first horizontal clock to him, but this is doubtful. Among many other inventions and improvements of clocks, he invented the compensating pendulum which bears his name.[97]

85. Jacques de Vaucanson (1709-1782) was a French mechanist. From his childhood he was always interested in mechanical contrivances. In 1738 he presented to the French Academy his remarkable flute player. Soon after, he made a duck which could swim, eat, and digest, and an asp which could hiss and dart on Cleopatra's breast. He later held the position of inspector of the manufacture of silk. In 1748 he was admitted to the Academy of Sciences. His machines were left to the Queen, but she gave them to the Academy, and in the disturbances which followed the pieces were scattered and lost. "Vaucanson published: 'Mécanisme d'un flúteur automate" (Paris, 1738).[98]

86. "[Descartes] *understood animal nature; he was the first to prove completely that animals are pure machines.*" Contrast this with La Mettrie's former reference in "L'histoire naturelle de l'âme" to "this absurd system 'that animals are pure machines.' Such a laughable

[96] Condensed from the *Century Dictionary*, Vol. IX.

[97] Translated and condensed from *La Grande Encyclopèdie*, Vol. 22.

[98] Translated and condensed from *La Grande Encyclopèdie*, Vol. 31.

opinion," he adds, "has never gained admittance among philosophers.....Experience does not prove the faculty of feeling any less in animals than in men."[99] It is evident that La Mettrie's opposition to this 'absurd system' was based upon his insistence on the similarity of men and animals. "L'homme machine" he argues from the same premise, that animals are machines, that men are like animals, and that therefore men also are machines.

[99] "L'histoire naturelle de l'ame," Chap. VI.

NOTES ON THE EXTRACTS FROM "L'HISTOIRE NATURELLE DE L'AME."

87. Matter, according to La Mettrie, is endowed with extensity, the power of movement, and the faculty of sensation. As La Mettrie says, this conception was not held by Descartes, who thought that the essential attribute of matter is extension. "The nature of body consists not in weight, hardness, color, and the like but in extension alone —in its being a substance extended in length, breadth and height."[100] Hobbes's conception of matter is very similar to that of La Mattrie. He specifically attributes motion to matter: "Motion and magnitude are the most common accidents of all bodies."[101] He does not name sensation as an attribute of matter, but he reduces sensation to motion. "Sense is some internal motion in the sentient."[102] Since motion is one of the attributes of matter, and since matter is the only reality in the universe, sensation must be attributed to matter.

88. La Mettrie always insists that matter has the power of moving itself, and resents any attempts to show that the motion is due to an outside agent. In this opinion he is in agreement with Toland. Toland says that those who have regarded matter as inert have had to find some efficient cause for motion; and to do this, they have held that all nature is animated. This pretended animation, however, is utterly useless, since matter is itself endowed with motion.

89. "*This absurd system....that animals are pure machines.*" (See Note 86.)

100 "Principles of Metaphysics," Part II, Prop. 4.
101 De Corpore," Part III, Chap. XV.
102 *Ibid.*, Part IV, Chap. XXV, (2).

WORKS CONSULTED AND CITED IN THE NOTES.

(An asterisk indicates the edition to which reference is made.)

JULIEN OFFRAY DE LA METTRIE.

1745 "L'histoire naturelle de l'âame." The Hague. (This work appears as "Traité de l'âme" in La Mettrie's collected works.)

1748 "L'homme machine." Leyden.

"L'homme machine par La Mettrie, avec une introduction et des notes." J. Assézat. Paris, 1865.

1751 "Œuvres philosophiques." London (Berlin).

1764 *"Œuvres philosophiques de Monsieur de la Mettrie," Amsterdam. Besides "L'homme machine" and "Traité de l'âme," the "Œuvres philosophiques" contain the following (dates of first publication added in parentheses):

"Abrégé des systèmes."
"L'homme plante" (1748).
"Les animaux plus que machines" (1750).
"L'Anti-Sénèque" (1748).
"L'art de jouir" (1751).
"Systéme d'Epicure."

ELIE LUZAC.

1748 "L'homme plus que machine." London (Leyden).

*"Man More than a Machine," translated from the the French of Elie Luzac, and printed with the translation of "Man a Machine" for G. Smith. 1750.

RENE DESCARTES.

1637 "Essais philosophiques," including "Discours de la méthode.

*"The Discourse on Method," translated by John Veitch. Open Court Publishing Co., 1903.

1641 "Meditationes de prima philosophia."
1644 "Principia philosophiae."
*"The Meditations and Selections from the Principles of Philosophy," translated by John Veitch. Open Court Publishing Co. 1905.
1650 "Les passions de l'âme."
*"Œuvres de Descartes," Vol. IV. Edited by Victor Cousin, Paris, 1824.

JOHN TOLAND.

1704 *"Letters to Serena." London. Printed for Bernard Lintot.

THOMAS HOBBES.

1650 "Human Nature or the Fundamental Elements of Policie." London.
1651 "Leviathan; Or the Matter, Form, and Power of a Commonwealth, Ecclesiastical and Civil." London.
1655 "Elementorum Philosophiae Sectio Prima: De Corpore." London.
*English Works edited by Sir William Molesworth, 1839-45. Volume III. Leviathan.
Volume IV. Human Nature.

JOHN LOCKE.

1690. "An Essay Concerning Human Understanding. London.
*Edition of Books II and IV (with omissions) preceded by the English version of Le Clerc's "Eloge historique de feu Mr. Locke," ed. M. W. Calkins. Open Court Publishing Co., 1905.

ETIENNE BONNOT DE CONDILLAC.

1754 "Traité des sensations." Paris and London.
1755 "Traité des animaux." Paris and London.
*"Œuvres completes," 23 vols. Edited by Guillaume Arnoux and Mousnier. Paris, 1798. Vol. III. "Traité des sensations. Traité des animaux."

Baron P. H. D. von Holbach.

1770 "Système de la nature," par M. Mirabaud [really Von Holbach].

*Nouvelle edition avec des notes et des corrections par Diderot. Paris, 1821.

C. A. Helvetius.

1758 "De l'esprit." Paris.

*"De l'esprit, or Essays on the mind and its several faculties," translated from the French by William Mulford. London, 1810.

1772 "De l'homme, de ses facultés, et de son éducation." 2 vols. London.

*"A Treatise on Man; His Intellectual Faculties His Education," translated from the French, with notes, by W. Hooper, M. D., 1810.

Frederick the Great.

*"Œuvres de Frederic II., Roi de Prusse, publiées du vivant de l'auteur." Berlin, 1789: "Eloge de Julien Offray de la Mettrie," Vol. III, pp. 159 ff.

Francis Bacon.

*"Sylva Sylvarum, sive Historia Naturalis," transcripta a J. Grutero Lug. Batavor. 1648.

F. A. Lange.

"History of Materialism," translated by Ernest Chester Thomas, Boston, 1877.

W. Windelband.

*"History of Philosophy," translated by J. H. Tufts, New York, 1898.

A. W. Benn.

*"History of English Rationalism in the Nineteenth Century." London, 1906.

"Le Grande Encyclopédie. Inventaire Raisonné des Sciences, des Lettres, et des Arts, par une Société de Savants et de Gens de Lettres." Paris, 1885-1903.
"The Encyclopaedia Britannica. A Dictionary of Arts, Sciences, and General Literature." Ninth Edition.
"The Century Dictionary and Cyclopedia." New York.
"Dictionary of Philosophy and Psychology," edited by J. M. Baldwin. London and New York, 1901.

PHILOSOPHICAL CLASSICS

Published in The

Religion of Science Library

Discourse on Method of Rightly Conducting the Reason and Seeking Truth in the Sciences.
By Rene Descartes. Translated by John Veitch. Authorized reprint. 50c.

The Meditations and Selections from the Principles of Rene Descartes.
Translated by John Veitch. With a Preface. Copies of the Original Title Pages, a Bibliography and an Essay on Descartes's Philosophy by L. Levi-Bruhl. 60c.

Enquiry Concerning the Human Understanding and Selections from a Treatise of Human Nature.
By David Hume, with Hume's Autobiography and a letter from Adam Smith. Edited by T. J. McCormack and Mary Whiton Calkins. Paper, 50c.

An Enquiry Concerning the Principles of Morals.
By David Hume. Reprinted from the edition of 1777. 50c.

A Treatise Concerning the Principles of Human Knowledge.
By George Berkeley. Reprint Edition. 50c.

Leibniz's Discourse on Metaphysics.
Correspondence with Arnauld, and Monadology; with an Introduction by Paul Janet. Translated by George R. Montgomery. 60c.

Kant's Prolegomena.
To any Future Metaphysics. Edited in English by Paul Carus, with an Essay on Kant's Philosophy and other supplementary material for the study of Kant. 60c.

St. Anselm: Proslogium, Monologium, an Appendix in Behalf of the Fool by Gaunilon; and Cur Deus Homo.
Translated from the Latin by Sidney Norton Deane, with an Introduction, Bibliography and reprints of the Opinions of Leading Philosophers and Writers on the Ontological Argument. 60c.

The Metaphysical System of Hobbes.
As contained in twelve chapters from his "Elements of Philosophy Concerning Body," and in briefer extracts from his "Human Nature" and "Leviathan," selected by Mary Whiton Calkins. 60c.

Locke's Essay Concerning Human Understanding.
Books II and IV (with omissions). Selected by Mary Whiton Calkins. 75c.

The Principles of Descartes' Philosophy.
By Benedictus De Spinoza. Translated from the Latin with an Introduction by Halbert Hains Britan. Paper, 40c.

Aristotle on His Predecessors.
Being the First Book of the Metaphysics. Translated by A. E. Taylor. 40c.

The above prices include postage.

Send for Complete Illustrated Catalogue.

THE OPEN COURT PUBLISHING COMPANY

339 EAST CHICAGO AVE. CHICAGO

SO-CCT-907